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

July 30, 2009

Mr. Charles G. Pardee
Senior Vice President, Exelon Generation Company, LLC
President and Chief Nuclear Officer, Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: OYSTER CREEK GENERATING STATION - NRC INTEGRATED INSPECTION REPORT 05000219/2009003

Dear Mr. Pardee:

On June 30, 2009, the U. S. Nuclear Regulatory Commission (NRC) completed an inspection at your Oyster Creek Generating Station. The enclosed integrated inspection report documents the inspection findings, which were discussed on July 16, 2009, with Mr. M. Massaro, 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.

The report documents two NRC-identified findings and five self-revealing findings of very low safety significance (Green). Five of these findings were determined to involve violations of NRC requirements. Additionally, two licensee-identified violations which were determined to be of very low safety significance are listed in this report. However, because of the very low safety significance and because they were entered into your corrective action program, the NRC is treating these findings as non-cited violations (NCVs) consistent with Section VI.A.1 of the NRC Enforcement Policy. If you contest any NCV, 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 Senior Resident Inspector at Oyster Creek Generating Station. In addition, if you disagree with the characterization of any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region I, and the NRC Senior Resident Inspector at Oyster Creek Generating Station. The information you provide will be considered in accordance with Inspection Manual Chapter 0305.

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

We appreciate your cooperation. Please contact me at (610) 337-5200 if you have any questions regarding this letter.

Sincerely,

/RA/

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

Docket No. 50-219
License No. DPR-16

Enclosure: Inspection Report 05000219/2009003
w/Attachment: Supplemental Information

cc w/encl:
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Sincerely,
/RA/
Ronald R. Bellamy, Ph.D., Chief
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U. S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No.:	50-219
License No.:	DPR-16
Report No.:	05000219/2009003
Licensee:	Exelon Generation Company, LLC (Exelon)
Facility:	Oyster Creek Nuclear Generating Station (Oyster Creek)
Location:	Forked River, New Jersey
Dates:	April 1, 2009 – June 30, 2009
Inspectors:	M. Ferdas, Senior Resident Inspector J. Kulp, Resident Inspector T. Fish, Sr. Operations Engineer H. Gray, Senior Reactor Inspector R. Nimitz, Senior Health Physicist Inspector S. Pindale, Senior Reactor Inspector S. Chaudhary, Reactor Inspector
Approved By:	Ronald R. Bellamy, Ph.D., Chief Projects Branch 6 Division of Reactor Projects

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SUMMARY OF FINDINGS

IR 05000219/2009003; 04/01/2009 - 06/30/2009; Exelon Generation Company, LLC, Oyster Creek Nuclear Generating Station; Flood Protection Measures, Maintenance Effectiveness, Post Maintenance Testing, Surveillance Testing, Identification and Resolution of Problems, and Event Followup

The report covered a 3-month period of inspection by resident inspectors, regional reactor inspectors, and a senior health physicist. Five Green non-cited violations (NCV) and two Green findings (FIN) were identified. The significance of most findings is indicated by their color (Green, White, Yellow, or Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP); the cross-cutting aspect was determined using IMC 0305, "Operating Reactor Assessment Program;" and findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

Cornerstone: Initiating Events

- Green. A self-revealing finding occurred when Exelon did not adequately evaluate the impact of water which had entered the service air system in December 2008, and resulted in an accumulation of failed desiccant and corrosion products in the 'C&D' instrument air dryer purge valve. This caused the purge valve to seize in the open position and an instrument air transient on April 5. This finding was determined not to be a violation of NRC requirements. Exelon's corrective actions included replacing the desiccant, repairing the air dryer purge valve and installing it in its proper orientation. This issue has been entered into Exelon's corrective action program.

  The finding was more than minor in accordance with IMC 0612, Appendix B (Section 1-3), "Issue Screening," because it was associated with the configuration control attribute of the initiating events cornerstone and affected the objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during power operation. In accordance with IMC 0609.04 (Table 4a), "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 determined that the finding was of very low safety significance (Green) using Table 2, "Initiators and Dependency Table for Oyster Creek Nuclear Generating Station," and Table 3.4, "SDP Worksheet for Oyster Creek Nuclear Generating Station – Loss of Instrument Air (LOIA)," in the Risk-Informed Inspection Notebook for Oyster Creek Nuclear Generating Station. The performance deficiency had a cross-cutting aspect in the area of problem identification and resolution, corrective action program [IMC 0305, Aspect P.1(c)], because Exelon did not fully evaluate the effect of the failure of the #3 air compressor after-cooler to include the potential of water intrusion into the service air system. (Section 1R12)

- Green. A self-revealing finding occurred when Exelon did not adequately evaluate operating experience (OE) regarding transformer cooling issues. Specifically, Exelon did

not identify and correct a single point vulnerability (SPV) on the main transformers cooling system control circuitry. This resulted in a manual reactor scram in April 2009 when the 'M1A' main power transformer lost all cooling and the cooling system could not be restored. This finding was determined not to be a violation of NRC requirements. Exelon's corrective actions included modifying the cooling system control circuitry on the 'M1A' and 'M1B' main power transformer to address the SPV. This issue has been entered into Exelon's corrective action program.

The finding was more than minor in accordance with IMC 0612, Appendix B (Section 1-3), "Issue Screening," because it was associated with the equipment performance attribute of the initiating events cornerstone and affected the objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during power operation. In accordance with IMC 0609.04 (Table 4a), "Phase 1 – Initial Screen and Characterization of Findings," the finding was determined to be of very low safety significance (Green). The performance deficiency had a cross-cutting aspect in the area of problem identification and resolution, operating experience [IMC 0305, Aspect P.2(a)], because Exelon did not evaluate relevant internal and external OE to identify a SPV in the transformer cooling system. (Section 4OA5)

Cornerstone: Mitigating Systems

- Green. The inspectors identified a NCV of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," because Exelon had not implemented effective actions to minimize water accumulation and submergence of medium voltage cables contained in the turbine building closed cooling water (TBCCW) heat exchanger pit as recommended by their cable conditioning monitoring program. Exelon's corrective actions included revising equipment operator instructions to direct them to ensure that cables were not maintained submerged. This issue has been entered into Exelon's corrective action program.

  The finding was more than minor in accordance with IMC 0612, Appendix B (Section 1-3), "Issue Screening," because it was associated with the equipment performance 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 IMC 0609.04 (Table 4a), "Phase 1 – Initial Screening and Characterization of Findings," the finding was determined to be of very low safety significance (Green). The performance deficiency had a cross-cutting aspect in the area of problem identification and resolution, operating experience [IMC 0305, Aspect P.2(b)], because Exelon did not implement and institutionalize operating experience through changes to station processes, procedures, and equipment. Specifically, Exelon did not change operations instructions or plant equipment to better monitor and remediate the presence of water in the TBCCW heat exchanger pit to minimize the submergence of medium voltage cables as recommended by internal and external operating experience. (Section 1R06)

- Green. A self-revealing NCV of Oyster Creek Technical Specifications 6.8.1, "Procedures and Programs," occurred when Exelon did not properly implement maintenance instructions and perform adequate soldering on the 'C2' battery charger. This resulted in a wire connected to the power thyristor control module to loosen during operation, which caused the battery charger to fail on April 13. Exelon's corrective actions included repairing the 'C2 battery charger, inspecting the other solder joints

accomplished during the maintenance activity, and evaluating the need for additional training for maintenance technicians. This issue has been entered into Exelon's corrective action program.

The finding was more than minor in accordance with IMC 0612, Appendix B (Section 1-3), "Issue Screening," because it was associated with the equipment performance 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 IMC 0609.04 (Table 4a), "Phase 1 – Initial Screening and Characterization of Findings," the finding was determined to be of very low safety significance (Green). The performance deficiency had a cross-cutting aspect in the area of human performance, resources [IMC 0305, Aspect H.2(b)], because the training of personnel was not sufficient to ensure nuclear safety. Specifically, although the initial qualification training provided Exelon personnel with the knowledge to perform proper solder joints, the lack of a continuing training program to maintain proficiency and the failure to perform just in time training prior to an infrequently performed maintenance evolution resulted in the overall training of the maintenance personnel to be insufficient to prevent the performance or identification of defective solder joints. (Section 1R12)

Cornerstone: Barrier Integrity

- Green. The inspectors identified a NCV of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures and Drawings," because Exelon did not ensure that the surveillance test procedure utilized for the standby gas treatment system (SBGTS) included appropriate acceptance criteria to determine the maximum allowable differential pressure (dP) for the high efficiency particulate absolute (HEPA) filters. Exelon's corrective actions included performing a technical evaluation to assess the operability of the SBGTS and revising the surveillance test procedure and control room alarm response procedure. This issue has been entered into Exelon's corrective action program.

  The finding was more than minor in accordance with IMC 0612, Appendix B (Section 1-3), "Issue Screening," because it was associated with the procedure quality attribute of the barrier integrity (maintain radiological barrier functionality of SBGTS trains - BWR only) cornerstone and affected the cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. In accordance with IMC 0609.04 (Table 4a), "Phase 1 – Initial Screening and Characterization of Findings," the finding was determined to be of very low safety significance (Green). The performance deficiency had a cross-cutting aspect in the area of human performance, resources [IMC 0305, Aspect H.2(c)], because Exelon did not ensure that accurate procedures were available for the surveillance test. Specifically, the acceptance criteria specified in the surveillance test procedure was not the same and was nonconservative to that specified in the Oyster Creek technical specifications. (Section 1R19)

- Green. A self-revealing NCV of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," occurred when Exelon did not identify a degraded condition on the #1 SBGTS HEPA filter in March 2009. This resulted in the HEPA filter exceeding the technical specification allowable acceptance criteria for pressure drop across the filter and the

#1 SBGTS being declared inoperable in May 2009. Exelon's corrective actions included eplacing the HEPA filters, reviewing #2 SBGTS historical performance data, and reviewing the expectations for system monitoring with engineering personnel. This issue has been entered into Exelon's corrective action program.

The finding was more than minor in accordance with IMC 0612, Appendix B (Section 1-3), "Issue Screening," because it was associated with systems, structures and components (SSC) and the barrier performance attribute of the barrier integrity (maintain radiological barrier functionality of SBGTS trains - BWR only) cornerstone and affected the cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. In accordance with IMC 0609.04 (Table 4a), "Phase 1 – Initial Screening and Characterization of Findings," the finding was determined to be of very low safety significance (Green). The performance deficiency had a cross-cutting aspect in the area of problem identification and resolution, corrective action program [IMC 0305, Aspect P.1(a)], because Exelon personnel did not identify an issue that potentially impacted nuclear safety. Specifically, Exelon personnel did not identify a degraded trend on the #1 SBGTS. (Section 1R22)

- Green. A self-revealing NCV of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings" occurred when Exelon personnel did not properly implement a procedure for the control of secondary containment integrity during maintenance activities when both reactor building roof access airlock hatches were maintained opened at the same time on April 1. Exelon's corrective actions included installing a label on the roof hatch doors which specify control requirements, replacing the door lock with one controlled by operations personnel, and reinforcing with maintenance personnel the requirements for pre-job briefings. This issue has been entered into Exelon's corrective action program.

  The finding was more than minor in accordance with IMC 0612, Appendix B (Section 1-3), "Issue Screening," because it was associated with the configuration control attribute of the barrier integrity (maintain radiological barrier functionality of SBGTS trains - BWR only) cornerstone and affected the cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. In accordance with IMC 0609.04 (Table 4a), "Phase 1 – Initial Screening and Characterization of Findings," the finding was determined to be of very low safety significance (Green). The performance deficiency had a cross-cutting aspect in the area of human performance, work practices [IMC 0305, Aspect H.4(a)], because human error prevention techniques were not used commensurate with the risk of the assigned task, such that work activities are performed safely. Specifically, Exelon personnel did not effectively utilize pre-job briefs and self and peer checks to ensure that secondary containment integrity would be maintained during maintenance activities on the reactor building roof. (Section 4OA2)

Violations of very low safety significance or severity level IV that were identified by Exelon have been reviewed by the inspectors. Corrective actions taken or planned by Exelon have been entered into Exelon's corrective action program. These violations and corrective action tracking numbers are listed in Section 4OA7 of this report.

REPORT DETAILS

Summary of Plant Status

The Oyster Creek Generating Station (Oyster Creek) began the inspection period operating at full power.

On April 8, the U. S. Nuclear Regulatory Commission (NRC) issued a renewed facility operating license (ADAMS Accession: ML 052720204) to Exelon Generation Company, LLC (Exelon) for Oyster Creek which authorized operation for an additional twenty years.

On April 10 and April 17, operations personnel performed a planned downpower to 85% to test and recover control rods following maintenance on their associated hydraulic control units. The plant was return to full power several hours after each downpower.

On April 25, operations personnel performed an unplanned manual reactor scram after the loss of cooling to the 'M1A' main power transformer. Exelon reported this event to the NRC in Event Notification 45021, "Manual Scram Following Loss of Cooling to Main Transformer." Additional information on this event is contained in section 4OA3 of this report. Exelon commenced a forced outage and repaired the cooling system on the 'M1A' transformer. During the shutdown, Exelon personnel performed modifications to the power supply logic for the cooling system on both main transformers, maintenance on the 'A' feedwater system, repaired two condensate system pipes that were identified as leaking prior to the shutdown, and began activities to replace the 'C' feedwater pump motor. Operators commenced a reactor startup and established the reactor critical on May 2, and synchronized the main generator to the grid on May 3. The plant restarted with two out of its three feedwater pumps, which limited power production to 70%. The plant reached full power on May 8 after maintenance activities on the 'C' feedwater pump motor were completed and the pump was returned to service.

On June 7 operations personnel performed a planned downpower to 80% for a rod pattern adjustment and turbine valve testing and returned to full power that same day.

Oyster Creek operated at full power for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01)

a. Inspection Scope (2 samples)

The inspectors performed one adverse weather preparation and one power system readiness inspection.

The inspectors reviewed Exelon's activities associated with seasonal readiness for hot weather conditions. The inspectors reviewed the updated final safety analysis report (UFSAR) for Oyster Creek to identify risk significant systems that require protection from hot weather conditions. The inspectors assessed the readiness of the service and instrument air, service water, emergency service water (ESW), and turbine building ventilation systems to seasonal susceptibilities of hot weather. The inspectors

performed a walkdown of the intake structure, turbine building, and reactor building. The inspectors reviewed Exelon's hot weather preparation activities to assess their adequacy and to verify they were completed in accordance with procedure requirements. The inspectors also reviewed applicable corrective action program condition reports to assess their reliability and material condition.

The inspectors evaluated Exelon's readiness to address issues that could impact offsite and alternate AC power systems. The inspectors reviewed Exelon's procedures and programs which discussed the operation and availability/reliability of offsite and alternate AC power systems during adverse weather. The inspectors verified that communication protocols between the transmission system operator and Exelon existed; and the appropriate information would be conveyed when potential grid stress and disturbances occurred. The inspectors also verified that Exelon's procedures contained actions to monitor and maintain the availability/reliability of offsite and onsite power systems prior to and during adverse weather conditions.

Documents reviewed for this inspection activity are listed in the Supplemental Information attachment to this report.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment (71111.04)

a. Inspection Scope (71111.04S – 1 sample & 71111.04Q - 3 samples)

The inspectors performed one complete and three partial equipment alignment inspections. The partial equipment alignment inspections were completed during conditions when the equipment was of increased safety significance such as would occur when redundant equipment was unavailable during maintenance or adverse conditions, or after equipment was recently returned to service after maintenance. The inspectors performed a partial walkdown of the following systems, and when applicable, the associated electrical distribution components and control room panels, to verify the equipment was aligned to perform its intended safety functions:

- 'C1' battery charger on April 6;
- Emergency Services Water (ESW) system #1 on May 12; and
- Core spray system #2 on May 26.

The inspectors performed a complete system alignment inspection on the containment spray system to determine whether the system was aligned and capable of removing heat from containment in accordance with design basis requirements. The inspectors reviewed operating procedures, system drawings, and the applicable equipment lineup list, to determine if the equipment was aligned to perform its safety function upon actuation.

Documents reviewed for this inspection activity are listed in the Supplemental Information attachment to this report.

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05)

a. Inspection Scope (71111.05Q - 5 samples)

The inspectors performed a walkdown of five plant areas to assess their vulnerability to fire. During plant walkdowns, the inspectors observed combustible material control, fire detection and suppression equipment availability, visible fire barrier configuration, and the adequacy of compensatory measures (when applicable). The inspectors reviewed "Oyster Creek Fire Hazards Analysis Report" and "Oyster Creek Pre-Fire Plans" for risk insights and design features credited in these areas. Additionally, the inspectors reviewed corrective action program condition reports documenting fire protection deficiencies to verify that identified problems were being evaluated and corrected. The following plant areas were inspected:

- Condenser bay area (TB-FZ-11E) on April 26;
- Reactor building -19'elevation/RBEDT Room (RB-FZ-1F2) on May 27;
- Reactor building 23' elevation (RB-FZ-1E) on June 7;
- Reactor building -19' elevation/Northeast Corner Room (RB-FZ-1F4) on June 25; and
- Intake structure (CM-FA-14) on June 29.

Documents reviewed for this inspection activity are listed in the Supplemental Information attachment to this report.

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures (71111.06)

a. Inspection Scope (2 samples)

The inspectors performed two internal flood protection inspections associated with bunkers and manholes. Inspections of the ESW (intake) cable vault and the turbine building closed cooling water (TBCCW) heat exchanger pit were performed, because they are subject to flooding and contain risk-significant cables. The inspectors performed a walk down of these areas to verify the physical condition of cables, conduits, sump pumps, and supports in these areas. The inspectors also reviewed Exelon's cable condition monitoring program to evaluate Exelon's actions to monitor cable degradation and actions to minimize water accumulation and submergence of medium voltage cables contained in these areas. Documents associated with these reviews are listed in the Supplemental Information attachment to this report.

b. Findings

Introduction. The inspectors identified a Green non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," because Exelon has not implemented effective actions to minimize water accumulation and submergence of medium voltage cables contained in the TBCCW heat exchanger pit as recommended by their cable conditioning monitoring program. Exelon's corrective actions included revising equipment operator instructions to direct them to ensure that cables were not maintained submerged.

Description. On May 19, during performance of an internal flooding inspection, the inspectors noted the presence of water (ground water infiltration) in the TBCCW heat exchanger pit located in the turbine building basement. At the time of the inspection the depth of water was approximately eight inches and the cable conduits within the pit were completely submerged. The pit contains medium voltage cables (4160 V) for the 'B' feedwater pump motor, 'B' reactor recirculation pump motor generator (MG) set, and 'B' core spray pump motor.

The inspectors noted that in June 2007, Exelon identified that the conduits in the pit were degraded and water was seeping into the pits (IR 645011). At that time, the inspectors concluded that this condition allowed the cables to be exposed and then submerged to water (e.g., cable in standing water) for potentially extended period of times. During the current inspection, the inspectors discussed this observation with engineering and operations personnel and concluded that the plant had operated with the conduits submerged for extended periods (lasting more than a few days) between June 2007 and May 2009 before operations personnel would take actions to drain the pit. In addition, the cables in the pit are not rated for continued water submergence. The inspectors also noted that in May 1999, Oyster Creek installed modification OC-MD-H352-001 to prevent water buildup around the conduits that were located beneath the concrete slab of the turbine building (including the pit area). This modification consisted of adding a timer to the power supply (to allow for automatic start) of the submersible pump, discharging into the turbine building floor drains for processing. At some unknown prior time period, operations personnel unplugged the pump from the power supply due to concerns with the quality of the water entering the radwaste system and reverted back to relying on manual actions from operations personnel to operate the installed sump pump. This approach was shown to be ineffective because of the buildup of water in this area and the subsequent submergence of cables.

The inspectors noted that Exelon's cable testing (CableWISE®) results on the 'B' core spray pump indicate a potential "negative" trend in cable condition. Specifically, the testing rated the cable as a Level 2 ("small amount of age related signals") in calendar year 2005; and testing in 2007 and 2009 rated the cable as a Level 3 ("low to moderate level of deterioration").

Exelon procedure ER-AA-3003, "Cable Monitoring Program," states that energized cables in wet environments accelerates the effects of aging; and if possible, cables should be kept dry to increase longevity of the cable insulation system. In addition Electric Power Research Institute (EPRI) report TR-103834-P1-2, "Effects of Moisture on the Life of Power Plant Cables," details a study that was performed on medium voltage cable failures in nuclear and fossil power plants. The report concluded that a number of

the cable failures occurred after cables were damaged during installation or had materials or extrusion problems and were subsequently subjected to water intrusion. Exelon's response to NRC Generic Letter 2007-01, "Inaccessible or Underground Power Cable Failures that Disable Accident Mitigation Systems or Cause Plant Transients," detailed previous failures of underground medium voltage power cables. Exelon's response documented twelve cable failures due to a variety of causes including water intrusion, manufacturing defects, and/or lightning surges.

Exelon documented this issue in corrective action program condition report IR 922187 and investigated the submergence of these cables. Exelon identified that the instructions utilized by operations personnel during daily plant tours were not specific enough, because although the instructions had operations personnel inspect the pit they did not direct them to maintain the water level in the pit below the conduits to avoid prolonged submergence.

Analysis. The performance deficiency associated with this inspector identified finding involved Exelon personnel not identifying and taking corrective actions to remove water from the turbine building pit and prevent the submergence of medium voltage cables for extended periods of time. The inspectors determined that the performance deficiency was not similar to the examples for minor deficiencies contained in Inspection Manual Chapter (IMC) 0612, Appendix E, "Examples of Minor Issues". The finding was more than minor in accordance with IMC 0612, Appendix B (Section 1-3), "Issue Screening," because it was associated with the equipment performance 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 IMC 0609.04 (Table 4a), "Phase 1 – Initial Screening and Characterization of Findings," the finding was determined to be of very low safety significance (Green) because the finding was not a design or qualification deficiency which resulted in a loss of operability or functionality, did not represent a loss of system safety function, did not represent an actual loss of safety function of a single train for greater than its technical specification allowed outage time, did not represent an actual loss of safety function of one or more non-technical specification trains of equipment designated as risk-significant for greater than 24 hours, and was not potentially risk significant due to a seismic, flooding or severe weather initiating event.

The performance deficiency had a cross-cutting aspect in the area of problem identification and resolution, operating experience (OE) [IMC 0305, Aspect P.2.(b)], because Exelon did not implement and institutionalize operating experience through changes to station processes, procedures, and equipment. Specifically, Exelon did not change operations instructions or plant equipment to better monitor and remediate the presence of water in the TBCCW heat exchanger pit to minimize the submergence of medium voltage cables as recommended by internal and external OE.

Enforcement. 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," states in part, that activities affecting quality, such as failures, malfunctions, deficiencies, deviations, defective material, and equipment and non conformances are promptly identified and corrected. Contrary to the above, Exelon personnel did not identify and correct a condition adverse to quality associated with submergence of safety related 'B' core

spray pump cable (and non-safety related 'B' feedwater pump cable and 'B' reactor recirculation pump motor MG set cables) which resulted in medium voltage cables being submerged for extended periods of time from June 2007 thru May 2009. Exelon procedure ER-AA-3003, "Cable Monitoring Program," states that energized cables in wet environments accelerates the effects of aging; and if possible cables should be kept dry to increase the longevity of the cable insulation system. However, because the finding was of very low safety significance (Green) and has been entered into their corrective action program in condition report IR 922187, this violation is being treated as an NCV, consistent with section IV.A of the NRC Enforcement Policy. **(NCV 05000219/2009003-01, Medium Voltage Cables Maintained Submerged for Extended Period of Time)**

1R07 Heat Sink Performance (71111.07)

a. Inspection Scope (71111.07A - 1 sample & 71111.07T – 2 samples)

The inspectors performed one annual and one triennial review of heat sink performance at Oyster Creek.

The inspectors verified acceptable heat exchanger performance by reviewing the results of one heat exchanger performance test. The inspectors reviewed the containment spray system/ESW (CS/ESW) #2 heat exchanger performance test data collected on April 23 to verify that the heat exchanger met performance requirements. The inspectors reviewed the test procedure and results to verify that appropriate test controls were incorporated correctly into the procedure, test acceptance criteria were consistent with design requirements, and that Exelon identified any potential heat exchanger deficiencies. The inspectors also reviewed the results of the inspection and cleaning that was performed by Exelon prior to the testing.

The inspectors also performed a triennial review of heat sink performance at Oyster Creek. Based on a plant specific safety and risk assessment and previous inspections, the inspectors selected the following two heat exchangers to review: the '1-1' reactor building closed cooling water (RBCCW) heat exchanger, and the #1 CS/ESW heat exchanger. The service water system cools the '1-1' RBCCW heat exchanger and the ESW system cools the #1 CS/ESW heat exchanger. The pumps associated with both cooling systems draw a suction from the Barnegat Bay intake canal (the ultimate heat sink).

The inspectors reviewed the methods (i.e., inspection, cleaning, maintenance, performance testing) that Exelon implemented to ensure that the heat removal capabilities of the selected heat exchangers were maintained. The inspectors reviewed the applicable commitments made in response to NRC Generic Letter 89-13, "Service Water System Problems Affecting Safety-Related Equipment," and Exelon's associated heat exchanger program guidelines to ensure the appropriate system and component monitoring was effective at trending heat exchanger performance.

The inspectors reviewed inspection and test results to evaluate the effectiveness of the heat exchanger performance monitoring programs. The inspectors reviewed the chlorination system, including system historical performance and effectiveness, to ensure that chemical treatment was properly controlled, tested, and evaluated.

The inspectors reviewed specific details associated with macrofouling that were recently experienced (2008) with the '1-1' RBCCW heat exchanger and microfouling recently experienced (2007, 2008) with the #1 CS/ESW heat exchanger. In particular, the inspectors reviewed Exelon's documentation and evaluation of the degraded performance; and assessed Exelon's planned and implemented corrective actions designed to improve system performance, including improvements to the effectiveness of the chlorination system and plans to clean the '1-1' CS/ESW sooner than originally scheduled (IR 874285).

In addition, the inspectors conducted walkdowns of the selected components, and reviewed a sample of corrective action program condition reports related to the heat exchangers, chlorination system and cooling systems to ensure that Exelon appropriately identified, characterized and corrected problems.

Documents reviewed are listed in the Supplemental Information attachment to this report.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification Program (71111.11)

a. Inspection Scope (71111.11B - 1 sample & 71111.11Q – 1 sample)

The inspectors performed one biennial review by regional specialists and one licensed operator requalification activity observation. Documents reviewed are listed in the Supplemental Information attachment to this report.

Biennial Review by Regional Specialists. The following inspection activities were performed using NUREG 1021, Rev. 9, Supplement 1, "Operator Licensing Examination Standards for Power Reactors," and NRC Inspection Procedure 71111.11B, "Licensed Operator Requalification Program."

The inspectors reviewed documentation of operating history since the last requalification program inspection. The inspectors also discussed facility operating events with the resident inspector staff. Documents reviewed included NRC inspection reports and Exelon corrective action program condition reports that may have involved performance errors by licensed operators. These reports were reviewed to ensure that operational events and operator performance errors were not indicative of possible training deficiencies.

The inspectors reviewed three comprehensive written exams, nine simulator scenarios, and fifteen job performance measures, which comprised the test items administered during the weeks of May 26, June 1, and June 8, to ensure the quality of these exams met or exceeded the criteria established in the Examination Standards and 10 CFR 55.59, "Requalification." The inspectors observed the administration of the operating exams to one crew during the onsite inspection week, which began June 1.

The inspector observed simulator performance during the conduct of the examinations, and reviewed simulator discrepancy reports to verify facility staff were complying with the requirements of 10 CFR 55.46, "Simulation Facilities." The inspector reviewed a sample of simulator tests including transient, steady state, and scenario-based tests.

The inspectors reviewed the following records to verify conformance with operator license conditions:

- Four medical records. All records were complete; restrictions noted by the doctor were reflected on the individual's license; and physical exams were given within 24 months of the last physical; and

- Two license reactivation records. The records indicated the operator conformed with the reactivation requirements of 10 CFR 55.53, "Conditions of Licenses."

On July 6, an in-office review of the final results of the operator requalification exams was conducted. These results included the annual operating tests and the comprehensive written exams. The inspection assessed whether pass rates were consistent with the guidance of NRC Manual Chapter 0609, Appendix I, "Licensed Operator Requalification Human Performance Significance Determination Process (SDP)." The inspector verified that:

- Crew failure rate on the dynamic simulator was less than 20%. (Actual Results: Failure rate was 0%);

- Individual failure rate on the dynamic simulator test was less than or equal to 20%. (Actual Results: Failure rate was 0%);

- Individual failure rate on the walkthrough test (JPMs) was less than or equal to 20%. (Actual Results: Failure rate was 0%);

- Individual failure rate on the comprehensive written exam was less than or equal to 20%. (Actual Results: Failure rate was 2.8%); and

- More than 75% of the individuals passed all portions of the exam (Actual Results: 97.2% of the individuals passed all portions of the exam).

Requalification Activities Reviewed by Resident Staff. The inspectors observed one simulator training scenario to assess operator performance and training effectiveness on April 14. The inspectors observed training scenarios 'OBE 09-3.1' and 'OBE 09-3.2.' The inspectors assessed whether the simulator adequately reflected the expected plant's response, operator performance met Exelon's procedural requirements, and the simulator instructor's critique identified crew performance issues.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12Q)

a. Inspection Scope (3 samples)

The inspectors performed three maintenance effectiveness inspection activities. The inspectors reviewed the following degraded equipment issues in order to assess the effectiveness of maintenance by Exelon:

- #2 emergency diesel generator (EDG) battery charger failure on March 23 (IR 896256);
- 'C/D' air dryer purge valve failure on April 8 (IR 905661 and 905350); and
- 'C2' battery charger failure on April 14 (IR 906861).

The inspectors also verified that the systems or components were being monitored in accordance with Exelon's maintenance rule program requirements. The inspectors reviewed completed maintenance work orders and procedures to determine if inadequate maintenance contributed to equipment performance issues. The inspectors also reviewed applicable work orders, corrective action program condition reports, operator narrative logs, maintenance training materials, and vendor manuals. Documents reviewed for this inspection activity are listed in the Supplemental Information attachment to this report.

b. Findings

There was one Green finding, one Green NCV, and one license identified violation (see section 4OA7 for details) identified.

Inadequate Evaluation Results In Instrument Air Transient

Introduction. A self-revealing Green finding occurred when Exelon did not adequately evaluate the impact of water which had entered the service air system in December 2008, and resulted in an accumulation of failed desiccant and corrosion products in the 'C&D' instrument air dryer purge valve. This caused the purge valve to seize in the open position and an instrument air transient on April 5. This finding was determined not to be a violation of NRC requirements. Exelon's corrective actions included replacing the desiccant, repairing the air dryer purge valve and installing it in its proper orientation.

Description. On April 5, control room operators received an unexpected instrument air dryer failure alarm accompanied by a drop in instrument air pressure. Operators implemented annunciator response procedures for the air dryer failure, and entered abnormal operating procedure (ABN) 35, "Loss of Instrument Air." Operations personnel responded to the alarms and identified that the purge valve for the 'C&D' instrument air dryer was stuck in the open position. The 'C&D' instrument air dryer was subsequently isolated which terminated the drop in air system pressure at 86 PSIG, before the standby air compressor was required to start. Instrument air pressure returned to normal shortly after operations personnel isolated the stuck open purge valve. Maintenance personnel inspected the purge valve and found failed desiccant and corrosion products in the valve actuator. Maintenance personnel replaced the desiccant and repaired the purge valve (WO M2221057), and the 'C & D' instrument air dryer was returned to service on April 8.

Exelon performed an evaluation (IR 903350) of this air system transient and concluded that the failure of the purge valve was a result of excessive moisture in the air system. This caused the air dryer's desiccant to break down and coat the internals of the purge valve and its actuator with failed desiccant. The source of the water was determined to be the failure of the #3 service air compressor after cooler in December 2008 (IR 852339 and 853007). In addition, Exelon's evaluation identified that the purge valve was installed in the wrong orientation (upside down), which allowed water to accumulate in the valve actuator and presented an environment conducive for corrosion products to develop. The combination of corrosion products and failed desiccant caused the valve to stick open and resulted in an air transient.

The inspectors noted through review of the vendor manual that if the valve was installed in the correct orientation, water would drain through a drain hole at the bottom of the actuator, lessening the potential for corrosion products to form. Based on reviews of previous work orders, the inspectors determined that the purge valve was last rebuilt on February 29, 2008.

Exelon's corrective actions included replacing the desiccant, repairing and reinstalling the purge valve in the correct orientation and revising the preventive maintenance procedure to provide guidance on the proper installation of the valve.

Analysis. The performance deficiency associated with this self-revealing finding involved Exelon not adequately evaluating the impact of water which had entered the service air system in December 2008, and resulted in failed desiccant and the buildup of corrosion products which accumulated in the 'C&D' instrument air dryer purge valve and its actuator. This caused the purge valve to seize in the open position and an instrument air transient on April 5. The inspectors determined that the performance deficiency was not similar to the examples for minor deficiencies contained in IMC 0612, Appendix E, "Examples of Minor Issues." The finding was more than minor in accordance with IMC 0612, Appendix B (Section 1-3), "Issue Screening," because it was associated with the configuration control attribute of the initiating events cornerstone and affected the objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during power operation.

In accordance with IMC 0609.04 (Table 4a), "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.

A Phase 2 evaluation was conducted using IMC 0609, Appendix A, "Determining the Significance of Reactor Inspection Findings for At-Power Situations," and the "Risk-Informed Inspection Notebook for Oyster Creek Nuclear Generating Station," Revision 2.01A. The inspectors made the following assumptions:

- The 'C & D' instrument air dryer was unavailable for a total of 62 hours. Therefore, an exposure time of less than 3 days was used to identify the Initiating Event Likelihood per Table 1, "Categories of Initiating Events for Oyster Creek Nuclear Generating Station," in the Risk-Informed Inspection Notebook for Oyster Creek Nuclear Generating Station.

- Using Table 1 in the "Risk-Informed Inspection Notebook for Oyster Creek Nuclear Generating Station," the specified initiating event likelihood of four (4) was increased by one order of magnitude to three (3), because the finding directly affects the likelihood of an initiating event (per usage rule 1.2, of IMC 0609, Attachment 2, Appendix A).

- Full credit was given for available mitigation capability equipment.

- No operator recovery credit was given.

The inspectors determined that the finding was of very low safety significance (Green) using Table 2, "Initiators and Dependency Table for Oyster Creek Nuclear Generating Station," and Table 3.4, "SDP Worksheet for Oyster Creek Nuclear Generating Station – Loss of Instrument Air (LOIA)," in the Risk-Informed Inspection Notebook for Oyster Creek Nuclear Generating Station. This analysis conservatively estimated the increase in core damage frequency at approximately 1 in 10,000,000 years (low E-7 range). The dominant core damage sequence involved the total loss of instrument air and a stuck open electromagnetic relief valve, with successful depressurization and a total loss of low pressure injection or the failure to depressurize.

With the ΔCDF for internal initiating events in the low E-7 range, the senior risk analyst (SRA) conducted a qualitative assessment of potential external event core damage frequency (CDF) initiators in accordance with IMC 0609, Appendix A and the potential increase in the large early release frequency (LERF) using IMC 0609, Appendix H, "Containment Integrity Significance Determination Process." This assessment determined that there was no significant increase in CDF given external events and that the resulting ΔLERF was of very low safety significance. Specifically:

- There was no external event CDF contributor associated with this finding, based on a review of the Oyster Creek Individual Plant Examination for External Events (IPEEE) report. No fire protection or other external initiating event mitigation credit was attributed to instrument air.

- The ΔLERF was estimated to be in the low E-8 range. Given the core damage sequences that would not result in water on the drywell floor, Appendix H initially estimated the LERF factor at 1.0. However, based on an understanding of the potential operator actions following these core damage sequences, the SRA applied several LERF mitigating factors. The factors included the possibilities of injection via core spray prior to vessel breach, fire water injection, and a unique concrete berm in containment that could be effective in containing core debris. By taking these factors into consideration, the SRA determined that a more appropriate LERF multiplier would be 0.2. Therefore, the increase in LERF was estimated at ΔCDF * 0.2.

The performance deficiency had a cross-cutting aspect in the area of problem identification and resolution, corrective action program [IMC 0305, Aspect P.1(c)], because Exelon did not fully evaluate the effect of the failure of the #3 air compressor after-cooler to include the potential of water intrusion into the service air system.

Enforcement: The function of the instrument air system has an impact on overall plant risk. The 'C & D' air dryer inlet valve is not a safety related component, and therefore no

violation of regulatory requirements occurred. Nonetheless, because the finding was of very low safety significance (Green) and Exelon entered this finding into their corrective action program in corrective action program condition report IR 903350, this is identified as a finding. **(FIN 05000219/2009003-02, Inadequate Evaluation Results In Instrument Air Transient).**

Improper Solder Joint Causes Safety Related Station Battery Charger Failure

Introduction. A self-revealing Green NCV of Oyster Creek Technical Specifications 6.8.1, "Procedures and Programs," occurred when Exelon did not properly implement maintenance instructions and perform adequate soldering on the 'C2' battery charger. This resulted in a wire connected to the power thyristor control module to loosen during operation, and caused the battery charger to fail on April 13. Exelon's corrective actions included repairing the 'C2' battery charger, inspecting the other solder joints accomplished during the maintenance activity, and evaluating the need for additional training for maintenance technicians.

Description. On April 11, maintenance technicians replaced the power thyristor control module in the 'C2' battery charger as part of corrective maintenance on the battery charger (WO R2119748). Following completion of repairs on April 12, the 'C2' battery charger was placed in service. On April 13, the control room received alarm 9XF-2-d, "BUS C UV," indicating that the 'C' battery voltage was low. Operations personnel responded to the alarm and found that the 'C2' battery charger appeared to be off line with a corresponding drop in 'C' battery voltage. Operations personnel placed the 'C1' battery charger in service which returned the 'C' battery voltage to normal and declared the 'C2' charger inoperable.

Maintenance personnel performed a visual inspection of the 'C2' battery charger and identified that a wire had become disconnected from a soldered terminal on one of three power thyristor control modules. The failure occurred at one of the new solder connections that were performed by maintenance personnel during the replacement of the power thyristor control module on April 11. The wire was re-soldered and all other soldered joints in the battery charger were inspected with no other deficiencies noted (WO C2021037). The 'C2' battery charger was returned to service on April 14.

Exelon performed an evaluation (IR 906861) on the failure of 'C2' battery charger and determined that the failure occurred because maintenance technicians performed the soldering activities on the battery charger incorrectly. The evaluation also stated that training was not effective in ensuring that soldering activities were properly performed because the use of continuing training or just-in-time training for this infrequently performed evolution was not utilized.

The inspectors noted that Exelon's training material provided adequate instructions on how to properly solder electrical connections. The training material also states that a good solder joint is always slightly concave, with good wetting of solder to both the wire and terminal. Additionally, there should be no pits or porosities on the surface of the solder and no evidence of any remaining pockets of flux. The maintenance performed on the 'C2' battery charger did not conform to these standards.

Exelon's corrective actions included repairing the 'C2' battery charger, inspecting the other solder joints accomplished during the maintenance activity, and evaluating the need for additional training for maintenance technicians.

Analysis. The performance deficiency associated with this self-revealing finding involved Exelon personnel not performing an adequate solder joint when installing the power thyristor control module in the 'C2' battery charger. This resulted in a wire connected to the power thyristor control module coming loose during operation which caused the battery charger to fail on April 13. The inspectors determined that the performance deficiency was not similar to the examples for minor deficiencies contained in IMC 0612, Appendix E, "Examples of Minor Issues." The finding was more than minor in accordance with IMC 0612, Appendix B (Section 1-3), "Issue Screening," because it was associated with the equipment performance 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 IMC 0609.04 (Table 4a), "Phase 1 – Initial Screening and Characterization of Findings," the finding was determined to be of very low safety significance (Green) because it was not a design or qualification deficiency that resulted in a loss of operability or functionality, it did not represent a loss of system safety function, it did not represent an actual loss of safety function of a single train for more than its technical specification allowed outage time, it did not represent an actual loss of safety function of one or more non-technical specification trains of equipment designated as risk-significant for more than 24 hours, and it did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event.

The performance deficiency had a cross-cutting aspect in the area of human performance, resources [IMC 0305, Aspect H.2(b)], because the training of personnel was not sufficient to ensure nuclear safety. Specifically, although the initial qualification training provides Exelon personnel with the knowledge to perform proper solder joints, the lack of a continuing training program to maintain proficiency and the failure to perform just in time training prior to an infrequently performed maintenance evolution resulted in the overall training of the maintenance personnel to be insufficient to prevent the performance or identification of defective solder joints.

Enforcement. Technical Specifications 6.8.1, "Procedures and Programs," states in part, that written procedures shall be established, implemented, and maintained covering the items in applicable procedures recommended in Appendix A of Regulatory Guide 1.33, Quality Assurance Program Requirements (Operations)." Regulatory Guide 1.33 states in part, that maintenance that can affect the performance of safety-related equipment shall be properly preplanned and performed in accordance with documented instructions appropriate to the circumstance. Contrary to the above, Exelon did not properly implement and perform soldering activities on the 'C2' battery charger per written maintenance instructions on April 11, which resulted in a battery charger failure on April 13. However, because the finding was of very low safety significance (Green) and has been entered into their corrective action program in condition report IR 906861, this violation is being treated as an NCV, consistent with section IV.A of the NRC Enforcement Policy. **(NCV 05000219/2009003-03, Improper Solder Joint Causes Safety Related Station Battery Charger Failure)**

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

a. Inspection Scope (4 samples)

The inspectors reviewed four on-line risk management evaluations through direct observation and document reviews for the following plant configurations:

- 'C2' battery charger, 'A/B' instrument air dryer, and #2 station air compressor unavailable due to planned maintenance, and combustion turbine #1 out of service due to unplanned maintenance on April 3, 2009;
- 'C2' battery charger, 'A/B' instrument air dryer, and #2 station air compressor unavailable for planned maintenance, and 'C/D' instrument air dryer unavailable due to unplanned maintenance on April 6, 2009;
- #1 SBGTS and core spray system #1 unavailable due to planned maintenance on May 26, 2009; and
- 'Z52' 34.5KV offsite power line unavailable due to planned maintenance, and #2 diesel fire pump and 'Q121' 34.5KV offsite power line unavailable due to severe weather in the area on June 9, 2009.

The inspectors reviewed the applicable risk evaluations, work schedules, and control room logs for these configurations to verify the risk was assessed correctly and reassessed for emergent conditions in accordance with Exelon's procedures. Exelon's actions to manage risk from maintenance and testing were reviewed during shift turnover meetings, control room tours, and plant walkdowns. The inspectors also used Exelon's on-line risk monitor (Paragon) to gain insights into the risk associated with these plant configurations. Additionally, the inspectors reviewed corrective action program condition reports documenting problems associated with risk assessments and emergent work evaluations. Documents reviewed for this inspection activity are listed in the Supplemental Information attachment to this report.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope (9 samples)

The inspectors reviewed nine operability evaluations for degraded or non-conforming conditions associated with:

- Acceptability of 'C1' battery charger on April 3 (IR 902664);
- 'A' 480V room fire protection sand bed degraded on April 8 (IR 904708);
- ESW cable vault flooded on April 16 (IR 910538);
- Assessment of 'M1A' transformer after loss of all cooling on April 25 (IR 911709);
- '1-1' reactor building closed cooling water (RBCCW) pump outboard bearing warm on April 26 (IR 911878);
- '52C' ESW pump oil leak on April 30 (IR 914224);

- Standby liquid control concentration below 10 CFR 50.62, "Requirements for Reduction of Risk from Anticipated Transients Without Scram (ATWS) Events for Light-Water-Cooled Nuclear Power Plants," equivalency requirements on May 15 (IR 919939);
- #1 SBGTS improper surveillance acceptance criteria on June 5 (IR 924629); and
- 'B' isolation condenser makeup valve failed in service test (IST) on June 30 (IR 936877).

The inspectors reviewed the technical adequacy of the operability evaluations to ensure the conclusions were technically justified. The inspectors also walked down accessible portions of equipment to corroborate the adequacy of Exelon's operability evaluations. Documents reviewed for this inspection activity are listed in the Supplemental Information attachment to this report.

b. Findings

No findings of significance were identified.

1R18 Plant Modifications (71111.18)

a. Inspection Scope (1 temporary and 2 permanent modification samples)

The inspectors reviewed one temporary and two permanent plant modifications that were performed at Oyster Creek. The inspectors reviewed the following modifications:

- Alternate security system power (temporary modification ECR-07-00112);
- 'M1A' main power transformer cooling control circuits (permanent modification ECR-09-00359); and
- Procedure change to SBGTS surveillance test 651.4.001,"Standby Gas Treatment System" (permanent modification OC-2009-S-0078).

The inspectors reviewed the engineering/procedure change packages, design basis and licensing basis documentation associated with each of the modifications to ensure that the systems associated with each of the modifications would not be adversely impacted by the change. The inspectors walked down portions of the systems associated with the modification when applicable. The inspectors reviewed the modifications to ensure they were performed in accordance with Exelon's modification process. The inspectors also ensured that revisions to licensing/design documents and operating procedures were properly revised to support implementation of the modification. The inspectors also reviewed Exelon's 10 CFR 50.59 screening for each of the modifications. Documents reviewed for this inspection activity are listed in the Supplemental Information attachment to this report.

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing (PMT) (71111.19)

a. Inspection Scope (7 samples)

The inspectors observed portions of and/or reviewed the results of seven post-maintenance tests for the following equipment:

- 'C/D' air dryer purge valve on April 8 (WO M2221673);
- 'B' isolation condenser rupture logic circuit on April 11 (WO C2020997);
- 'C2' battery charger on April 12 (WO R2119748);
- '1-2' ESW pump motor cable replacement on April 18 (WO C2016804);
- Drywell sump discharge valve (V-22-29) on May 1 (WO C2019757);
- #1 SBGTS high efficiency particulate absolute (HEPA) filter on May 26 (WO C2021298); and
- #1 SBGTS flow detector and HEPA filter on June 12 (WO C2021359).

The inspectors verified that the post-maintenance tests conducted were adequate for the scope of the maintenance performed and that they ensured component functional capability. Documents reviewed for this inspection activity are listed in the Supplemental Information attachment to this report.

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 ensure that the surveillance test procedure utilized for the SBGTS included appropriate acceptance criteria to determine the maximum allowable differential pressure (dP) for the HEPA filters. Exelon's corrective actions included performing a technical evaluation to assess the operability of the SBGTS and revising the surveillance test procedure and control room alarm response procedures.

Description. On May 26, operations personnel performed a PMT on SBGTS #1 after replacement of its HEPA filters (WO C2021298). During the review of the PMT results, the inspectors identified that the acceptance criteria listed in surveillance test 651.4.001, "Standby Gas Treatment System Test," was different and non-conservative when compared to the acceptance criteria contained in the Oyster Creek technical specifications figure 4.5.1, "Maximum Allowable Pressure Drop for HEPA Filters". Specifically, the inspectors noted that for the air flow rate measured during the PMT, the surveillance procedure acceptance criteria allowed a maximum dP of 2.57 inches of water, whereas for the same flow rate, the maximum dP allowed per the technical specifications was less than or equal to 2.5 inches of water. Operations personnel recorded a HEPA filter dP of 2.49 inches of water during performance of the test. Based on the graph contained in the Oyster Creek technical specifications, the inspectors questioned the operability of the #1 SBGTS because due to the quality of the graph, there was reasonable doubt on the operability of the equipment. Exelon documented this issue in corrective action program condition report IR 924629 and operations personnel requested that engineering personnel evaluate the inspector's concerns and verify operability of the SBGTS.

Engineering personnel performed technical evaluation (IR 924629 Activity 2) and determined that the graph utilized in procedure 651.4.001 was incorrect and non-conservative. The evaluation also determined that SBGTS #1 met its testing acceptance criteria and remained operable. Exelon also performed a review of previous test results

on #2 SBGTS and concluded that it remained operable. The inspectors reviewed the technical evaluation against criteria outlined in IP 71111.15. (See section R15 for details.)

The inspectors noted that the acceptance criteria in the surveillance procedure was changed in July 2007, from the same graph used as acceptance criteria in technical specifications, to a graph covering a smaller range of air flow centered on the air flows normally observed during performance of the surveillance test. This revision was processed as an editorial change and did not require a technical review per Exelon procedure AD-AA-101, "Processing of Procedures and T&RMs."

Exelon's corrective actions included revision of the surveillance test procedure and the alarm response procedures and a review of data from past performances of this surveillance on the SBGTS.

Analysis. The performance deficiency associated with this inspector identified finding involved Exelon not ensuring that the surveillance test procedure utilized for the SBGTS included appropriate acceptance criteria to determine the maximum allowable dP for the HEPA filters. The inspectors determined that the performance deficiency was similar to the "not minor if" statement contained in example 3j of IMC 0612, Appendix E, "Examples of Minor Issues," because reasonable doubt of the operability of the system existed, necessitating further analysis to determine that the system was operable. The finding was more than minor in accordance with IMC 0612, Appendix B (Section 1-3), "Issue Screening," because it was associated with the procedure quality attribute of the barrier integrity (maintain radiological barrier functionality of SBGTS trains - BWR only) cornerstone and affected the cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events.

In accordance with IMC 0609.04 (Table 4a), "Phase 1 – Initial Screening and Characterization of Findings," the finding was determined to be of very low safety significance (Green) because the finding only represented a degradation of the radiological barrier function provided for the SBGTS (BWR).

The performance deficiency had a cross-cutting aspect in the area of human performance, resources [IMC 0305, Aspect H.2(c)], because Exelon did not ensure that accurate procedures were available for the surveillance test. Specifically, the acceptance criteria specified in surveillance test procedure 651.4.001 was not the same and was non-conservative to that specified in the Oyster Creek technical specifications.

Enforcement. 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," states in part, that activities affecting quality shall be prescribed by procedures of a type appropriate to the circumstances and shall be accomplished in accordance with these procedures. 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, Exelon did not maintain appropriate acceptance criteria in surveillance test procedure 651.4.001 for the allowed maximum pressure drop (i.e., dP) for the HEPA filters between July 2007 and May 2009. Specifically, in July 2007, Exelon revised the procedure with a graph that was non-conservative when compared to the acceptance criteria specified in technical

specification figure 4.5.1. However, because the finding was of very low safety significance (Green) and has been entered into their corrective action program in condition report IR 924629, this violation is being treated as an NCV, consistent with section IV.A of the NRC Enforcement Policy. **(NCV 05000219/2009003-04, Non-Conservative Acceptance Criteria Specified In SBGTS Surveillance Procedure)**

1R20 Refueling and Other Outage Activities (71111.20)

a. Inspection Scope (1 sample)

The inspectors monitored Exelon's activities associated with the outage activities described below. Documents reviewed for this inspection activity are listed in the Supplemental Information attachment to this report.

On April 25, operators initiated a manual reactor scram and completed a plant shutdown to support a forced maintenance outage due to a loss of cooling on the 'M1A' main power transformer. The inspectors observed portions of the shutdown from the control room, and reviewed plant logs to ensure that technical specification requirements were met for placing the reactor in "hot shutdown" and "cold shutdown." The inspectors also monitored Exelon's controls over outage activities to determine whether they were in accordance with procedures and applicable technical specification requirements.

The inspectors verified that cooldown rates during the plant shutdown were within technical specification requirements. The inspectors performed a walkdown of portions of the condenser bay on April 26 to verify there was no evidence of leakage or visual damage to passive systems contained in these areas. The inspectors verified that Exelon assessed and managed the outage risk. The inspectors confirmed on a sampling basis that tagged equipment was properly controlled and equipment configured to safely support maintenance work. During control room tours, the inspectors verified that operators maintained reactor vessel level and temperature within the procedurally required ranges for the operating condition. The inspectors also verified that the decay heat removal function was maintained through monitoring shutdown cooling (SDC) parameters and performing a walkdown of the system on April 26. The inspectors observed Oyster Creek's plant onsite review committee (PORC) startup affirmations on April 28, April 30, and May 1.

The inspectors monitored restart activities that began on May 2, to ensure that required equipment was available for operational condition changes, including verifying technical specification requirements, license conditions, and procedural requirements. Portions of the startup activities were observed from the control room to assess operator performance. The inspectors also verified that unidentified leakage and identified leakage rate values were within expected values and within technical specification requirements.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope (1 IST & 5 routine surveillance samples)

The inspectors observed portions of and/or reviewed the results of six surveillance tests:

- 'B' isolation condenser isolation test and calibration on April 10;
- 'C1' battery charger surveillance test on April 15;
- Main steam isolation valve (MSIV) closure and IST on April 27;
- #1 EDG fast start test on May 11;
- #1 SBGTS surveillance test on May 24; and
- Main steam high flow test and calibration on June 2.

The inspectors verified that test data was complete and met procedural requirements to demonstrate the systems and components were capable of performing their intended function. The inspectors also reviewed corrective action program condition reports that documented deficiencies identified during these surveillance tests. Documents reviewed for this inspection activity are listed in the Supplemental Information attachment to this report.

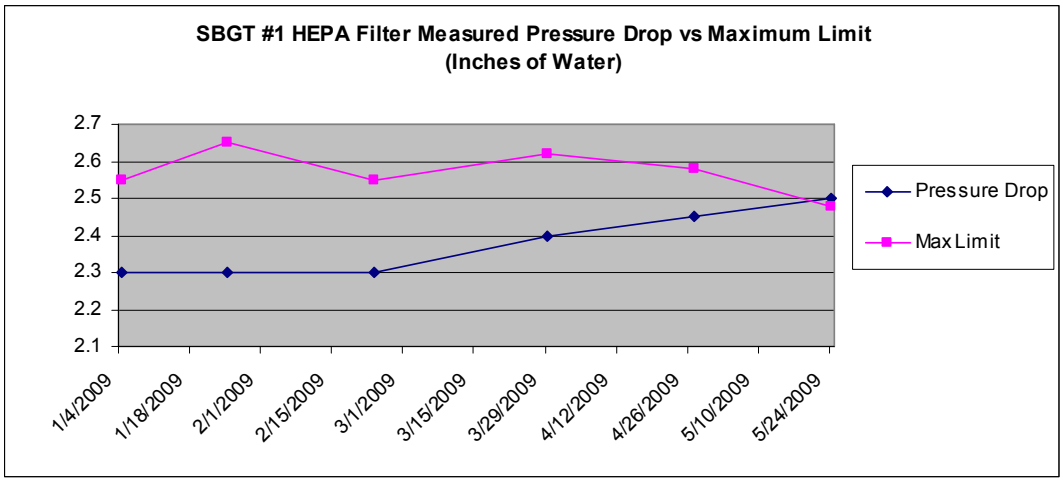
b. Findings

Introduction. A self-revealing Green NCV of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," occurred when Exelon did not identify a degraded condition on the #1 SBGTS HEPA filter in March 2009. This resulted in the HEPA filter exceeding the technical specification allowable acceptance criteria for pressure drop across the filter and the #1 SBGTS being declared inoperable in May 2009. Exelon's corrective actions included replacing the HEPA filters, reviewing #2 SBGTS historical performance data, and reviewing the expectations for system monitoring with engineering personnel.

Description. On May 24, during performance of monthly surveillance test 651.4.001, "Standby Gas Treatment System Test," the #1 SBGTS upstream HEPA filter 'F-28-2' did not meet its technical specification acceptance criteria for pressure drop across the filter for its measured flow rate. Figure 4.5.1, "Maximum Allowable Pressure Drop For HEPA Filters," in Oyster Creek's technical specifications provides the allowable acceptance criteria for the HEPA filters. The inspectors noted that the maximum allowed pressure drop varies from each surveillance test because it is determined based on the measured flow rate. The measured pressure drop across the filter was 2.5 inches of water versus a maximum allowable value of 2.48 inches of water. Operations personnel declared #1 SBGTS inoperable and maintenance personnel replaced the upstream and downstream filters on May 25 (WO C2021298). Test procedure 651.4.001 was successfully completed on May 26 and #1 SBGTS was returned to an operable status.

Exelon performed an evaluation (IR 923558) and determined that the filter started to experience a degraded trend in pressure drop across the HEPA filters beginning in March 2009. The evaluation identified that performance monitoring and trending on the SBGTS was not being performed as required by Exelon's procedure ER-AA-2003, "System Performance Monitoring and Analysis;" and that this trending information could have identified the degraded trend, allowing Exelon personnel to perform corrective actions prior to the #1 SBGTS being declared inoperable.

The inspectors reviewed #1 SBGTS performance data (flow, temperature, HEPA filter dP, Reactor Building dP) between January 2006 thru May 2009 and various Exelon procedures to determine if it was reasonable for Exelon personnel to have identified this degraded condition. The inspectors evaluated the performance data with the graph below and identified that in March 2009 the pressure drop began to increase.



Exelon's procedure ER-AA-2003 establishes the minimum standards for system performance monitoring by engineering personnel. The procedure states that system engineers will perform performance monitoring thru trending and analyzing system and component data against established action levels. The procedure further states that if adverse trends are identified then an evaluation should be performed to determine the required actions. The inspectors determined that there was sufficient data and procedural guidance available for Exelon to identify that an adverse trend existed on the #1 SBGTS upstream HEPA filter.

Exelon's corrective actions included replacing the HEPA filters, reviewing #2 SBGTS historical performance data, and reviewing the expectations for system monitoring with engineering personnel.

Analysis. The performance deficiency associated with this self-revealing finding involved Exelon personnel not identifying a degraded condition on #1 SBGTS upstream HEPA filter which resulted in the subsequent inoperability of the #1SBGTS. The inspectors determined that the performance deficiency was not similar to the examples for minor deficiencies contained in IMC 0612, Appendix E, "Examples of Minor Issues." The finding was more than minor in accordance with IMC 0612, Appendix B (Section 1-3), "Issue Screening," because it was associated with the systems, structures and components (SSC) and barrier performance attribute of the barrier integrity (maintain radiological barrier functionality of SBGTS trains - BWR only) cornerstone and affected the cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events.

In accordance with IMC 0609.04 (Table 4a), "Phase 1 – Initial Screening and Characterization of Findings," the finding was determined to be of very low safety significance (Green) because the finding only represented a degradation of the radiological barrier function provided for the SBGTS (BWR).

The performance deficiency had a cross-cutting aspect in the area of problem identification and resolution, corrective action program [IMC 0305, Aspect P.1(a)], because Exelon personnel did not identify an issue that potentially impacted nuclear safety. Specifically, Exelon personnel did not identify a degraded trend on the #1SBGTS.

Enforcement. 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," states in part, that measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment and nonconformances are promptly identified and corrected. Contrary to the above, Exelon did not identify that a deficiency existed on the SBGTS. Specifically, Exelon personnel did not identify a degrading trend in #1 SBGTS Upstream HEPA filter 'F-28-2' performance in March and April 2009 and subsequently resulted in #1 SBGTS being declared inoperable on May 24, 2009. However, because the finding was of very low safety significance (Green) and has been entered into their corrective action program in condition reports IR 923558 and IR 926650, this violation is being treated as an NCV, consistent with section IV.A of the NRC Enforcement Policy. **(NCV 05000219/2009003-05, Adverse Trend on #1 SBGTS Not Identified)**

4. OTHER ACTIVITIES [OA]

4OA1 Performance Indicator Verification (71151)

a. Inspection Scope (4 samples)

The inspectors reviewed performance indicator (PI) data associated with four PIs. The inspectors used the guidance provided in Nuclear Energy Institute (NEI) 99-02, Revision 5, "Regulatory Assessment Performance Indicator Guideline," to assess the accuracy and completeness of the PI data reported by Exelon.

The inspectors reviewed Exelon's reported data from April 1, 2008 through March 31, 2009 for the following PIs:

- "Unplanned Scram per 7000 Critical Hours;"
- "Unplanned Power Changes per 7000 Critical Hours;"
- "Unplanned Scram with Complications;" and
- "Safety System Functional Failures (SSFF)."

Documents reviewed for this inspection activity are listed in the Supplemental Information attachment to this report.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems (71152)

.1 Review of Items Entered Into the Corrective Action Program

The inspectors performed a daily screening of items entered into Exelon's corrective action program to identify repetitive equipment failures or specific human performance issues for follow-up. This was accomplished by reviewing hard copies of each condition report, attending daily screening meetings, or accessing Exelon's computerized database.

.2 Semi-Annual Review to Identify Trends

a. Inspection Scope (1 sample)

The inspectors performed a semi-annual trend review covering the six-month period between December 1, 2008 and June 1, 2009. The inspectors reviewed Exelon's corrective action program documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors also performed a walkdown of equipment important to safety to ensure issues were being properly identified and corrected in the corrective action program. The review was focused on repetitive equipment problems, human performance issues, and program implementation issues. The results of the trend review by the inspectors were compared with the results of normal baseline inspections. The review included issues documented outside the normal corrective action system, such as in system health reports and Oyster Creek monthly management reports.

b. Assessment and Observations

No findings of significance were identified. No unidentified adverse trends were identified. The inspectors observed that Exelon's corrective action program was effective in ensuring that the "affected system" field of submitted IRs was properly coded and allowing issues affecting a plant system to be easily culled from the corrective action database. This is an improvement from observations noted during the 2008 Problem Identification and Resolution inspection (see NRC inspection report 05000219/2008009, dated September 22, 2008).

.3 Annual Sample Review

a. Inspection Scope (1 Annual sample)

The inspectors reviewed Exelon's evaluation and corrective actions associated with the following issue. Documents reviewed for this inspection activity are listed in the Supplemental Information attachment to this report.

Loss of Secondary Containment Integrity. The inspectors reviewed Exelon's evaluation and corrective actions associated with corrective action program condition report IR 901285 which involved a loss of secondary containment integrity during maintenance activities on April 1. The inspectors reviewed this issue to ensure that the full extent of the issue was identified, evaluated, and the corrective actions were specified and properly prioritized. The inspectors discussed this issue with maintenance and operations personnel and reviewed applicable procedures. The inspectors also performed a walk down of the reactor building to determine if similar conditions existed

that could result in secondary containment or other system boundary breaches and that controls were in place (i.e., signs and procedures) to prevent breaches similar to this issue.

b. Findings and Observations

There was one Green self-revealing NCV identified due to Exelon personnel not properly maintaining secondary containment integrity.

The inspectors determined that, in general, Exelon appropriately evaluated the issue commensurate with its safety significance. The inspectors noted that the evaluation did not recognize that the work order (WO A2214101) used to perform repairs on the reactor building roof was not adequate. Specifically, the work order was prepared in accordance with Exelon's minor maintenance procedure (MA-AA-716-003, "Tool Pouch/Minor Maintenance") when it should have been planned as a "Level 2" work order per procedure MA-AA-716-010, "Maintenance Planning." Exelon documented this observation in corrective action program condition report IR 930183. The inspectors determined that the improper work order planning did not contribute to the cause of this event; however, it should have been identified as an ancillary program implementation issue.

The inspectors determined that the corrective actions taken to address the loss of secondary containment integrity during maintenance activities on the reactor building roof were reasonable and adequate. The inspectors noted that the corrective actions were effective based on secondary containment integrity being maintained during maintenance activities on the reactor building roof in June 2009.

Introduction. A self-revealing Green NCV of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings" occurred when Exelon personnel did not properly implement a procedure for the control of secondary containment integrity during maintenance activities when both reactor building roof access airlock hatches were maintained opened at the same time on April 1. Exelon's corrective actions included installing a label on the roof hatch doors which specify control requirements, replacing the door lock with one controlled by operations personnel, and reinforcing with maintenance personnel the requirements for pre-job briefings.

Description. On April 1, access airlock hatch doors in the reactor building were utilized by maintenance personnel to bring repair materials to the reactor building roof (work order A2214101). During performance of this activity both access hatch doors were open at the same time resulting in a loss of secondary containment integrity for approximately one hour. During the course of the maintenance activities, operations personnel placed #1 SBGTS in service to support testing on the reactor building ventilation system that was also in progress. Approximately twenty minutes after placing the SBGTS in service, the main control room received an alarm due to low reactor building differential pressure. Operations personnel confirmed that reactor building differential pressure was -0.15 inches water and investigated the cause of the alarm. Operations personnel identified that both doors to the airlock to the reactor building roof were open at the same time. Both doors were subsequently closed and reactor building differential pressure returned to normal levels (greater than -0.25 inches water).

Oyster Creek's UFSAR section 6.2, "Containment Systems," states in part, that the reactor building and the SBGTS system provide secondary containment function when primary containment is in service. The primary objective of the reactor building (i.e., secondary containment) is to minimize ground level release of airborne radioactive materials, and to provide for controlled, elevated release through the stack of the building's atmosphere under accident conditions. It further states that the reactor building is designed to have a limited in-leakage rate in the isolated condition with the SBGTS exhausting the building atmosphere, through filters, to the plant stack, and maintaining the reactor building below atmospheric pressure of -0.25 inches of water. In addition, Oyster Creek procedure 312.10, "Secondary Containment Control," states that secondary containment integrity is met when at least one door at each access opening is closed, SBGTS is operable, and all automatic secondary containment isolation valves are operable or are secured in the closed position.

Exelon performed an evaluation (IR 901285) and determined that the loss of secondary containment integrity occurred because maintenance personnel did not effectively utilize human error prevention techniques (such as pre-job brief and first and peer checks) to identify the impact the maintenance activities would have on secondary containment integrity.

Exelon's corrective actions included installing a label on the roof hatch doors which specify control requirements, replacing the door lock with one controlled by operations personnel, and reinforcing with maintenance personnel the requirements in HU-AA-1211, "Briefings-Pre-Job, Heightened Level of Awareness, Infrequent Plant Activity, and Post-Job Briefings."

Analysis. The performance deficiency associated with this self-revealing finding involved Exelon personnel not properly controlling secondary containment integrity during maintenance activities per procedure 312.10 when both reactor building roof access airlock hatches were maintained opened at the same time on April 1. The inspectors determined that the performance deficiency was not similar to the examples for minor deficiencies contained in IMC IMC 0612, Appendix E, "Examples of Minor Issues". The finding was more than minor in accordance with IMC 0612, Appendix B (Section 1-3), "Issue Screening," because it was associated with the configuration control attribute of the barrier integrity (maintain radiological barrier functionality of SBGTS trains - BWR only) cornerstone and affected the cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events.

In accordance with IMC 0609.04 (Table 4a), "Phase 1 – Initial Screening and Characterization of Findings," the finding was determined to be of very low safety significance (Green) because the finding only represented a degradation of the radiological barrier function provided for the SBGTS (BWR).

The performance deficiency had a cross-cutting aspect in the area of human performance, work practices [IMC 0305, Aspect H.4(a)], because human error prevention techniques were not used commensurate with the risk of the assigned task, such that work activities are performed safely. Specifically, Exelon personnel did not

effectively utilize pre-job briefs and self and peer checks to ensure that secondary containment integrity would be maintained during maintenance activities on the reactor building roof.

Enforcement. 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," states in part, that activities affecting quality shall be prescribed by procedures of a type appropriate to the circumstances and shall be accomplished in accordance with these procedures. Oyster Creek procedure 312.10 states that secondary containment integrity is established when the reactor building is closed and the following conditions are met: at least one door at each access opening is closed, SBGTS is operable, and all automatic secondary containment isolation valves are operable or are secured in the closed position. Contrary to the above, Exelon personnel did not maintain secondary containment integrity on April 1 for approximately one hour in accordance with procedure 312.10 when both airlock hatch doors to the reactor building roof were maintained open at the same time during maintenance activities. However, because the finding was of very low safety significance (Green) and has been entered into their corrective action program in condition report IR 901285, this violation is being treated as an NCV, consistent with section IV.A of the NRC Enforcement Policy. **(NCV 05000219/2009003-06, Loss of Secondary Containment Integrity During Maintenance on Reactor Building Roof)**

4OA3 Event Followup (71153) (5 samples)

The inspectors performed five event followup inspection activities. Documents reviewed for this inspection activity are listed in the Supplemental Information attached to this report.

.1 Water with Tritium Identified in Intake Cable Vault

a. Inspection Scope

On April 15, Exelon initiated maintenance activities which involved replacement of electrical cables on the '1-2' ESW pump motor. This activity required access to the ESW cable vault. When the manway was opened, Exelon personnel observed approximately twelve inches of standing water. In accordance with Exelon's environmental programs, the water was sampled and on April 16 the analysis identified levels of tritium at a concentration of 1.02E-4 uCi/ml (i.e., 102,000 pCi/L). The water in the cable vault was subsequently pumped into drums to allow for it to be controlled and processed, as appropriate. Exelon notified the New Jersey Department of Environmental Protection, Bureau of Nuclear Engineering (BNE) and the NRC (NRC Event Notification 44993, "Offsite Notification Due to Potential Release of Tritium") on April 16. Exelon documented this issue in corrective action program condition report IR 907846.

Regional inspectors, with assistance from the resident inspectors, monitored Exelon's investigation into the source of the tritium leak, as well as their environmental sampling and monitoring program. The results of these reviews will be contained in NRC inspection report 05000219/2009008.

Findings

No findings of significance were identified. Preliminary Exelon reviews did not identify any immediate public or occupational health and safety impacts. The issue is being reviewed in NRC inspection report 05000219/2009008.

.2 Offgas Flow Isolation

a. Inspection Scope

On April 20, the augmented offgas (AOG) system was removed from service for planned maintenance. The maintenance included replacement of the actuator on valve 'AOV-001B', "1B AOG Recombiner Inlet Valve." During performance of maintenance on the AOG system, the plant was aligned for off gas thru the steam jet air ejectors (SJAE) to the plant stack through valve 'V-7-31', "SJAE Outlet to Stack Valve." On April 21, during installation of the actuator on 'AOV-001B,' a closed valve signal was received on 'V-7-31,' when the limit switch moved in the open direction on 'AOV-001B'. This caused off gas to isolate. Operations personnel responded to the offgas flow isolation by monitoring main condenser vacuum and directing activities within the plant to re-establish offgas flow to the plant stack. The isolation last approximately fifteen minutes and operations personnel did not note any signs of main condenser vacuum degradation during the event.

Exelon's evaluation of this event identified that the event was caused by an inadvertent operation of the contacts in the valve control logic associated with 'V-7-31' during reinstallation of the limit switch associated with 'AOV-001B'. The evaluation concluded that maintenance and operations personnel did not properly identify during the work planning process the potential impact the limit switch and control logic on 'AOV-001B' had on the off gas system and did not identify and implement mitigating actions (i.e., electrical isolation of limit switch).

The inspectors responded to the control room following notification of the off gas isolation and monitored the response by operations and maintenance personnel. The inspectors performed a walkdown of the main control room panels and indications to verify equipment status and plant parameters during the event. The inspectors reviewed plant procedures, control room narrative logs, corrective action program condition reports, and interviewed operation and maintenance personnel to understand how plant personnel and equipment responded prior to and during the event. The inspectors also reviewed plant process computer data and plant training/simulator model data to understand the expected and actual plant response.

The event is described and evaluated in corrective action program condition report IR 910085.

b. Findings

No findings of significance were identified.

.3 Manual Reactor Scram Due to Loss of Cooling On 'M1A' Main Power Transformer

a. Inspection Scope

On April 25, operations personnel in the control room responded to unexpected 'M1A' main power transformer alarms as temperatures on the transformer began to increase. Operations personnel identified that all pumps and fans on the 'M1A' main power transformer cooling system were not working and could not be restored. Upon notification, operations personnel implemented their alarm response procedures and commenced a power reduction to maintain 'M1A' main power transformer temperature below alarm set points. During the course of the power reduction, engineering personnel were consulted and recommended that the transformer not be operated for greater than one hour without forced cooling (pumps and fans). Operations personnel stopped the power reduction and performed a manual reactor scram from 74% power in accordance with plant procedures prior to exceeding the one hour guidance provided by engineering.

The inspectors responded to the site and reported to the control room to observe the response of Exelon personnel to the event. The inspectors verified that conditions did not meet the entry criteria for an emergency action level (EAL) as described in the Oyster Creek EAL matrix. In addition, the inspectors reviewed 10 CFR 50.72, "Immediate Notification Requirements for Operating Nuclear Power Reactors," to verify that Exelon properly notified the NRC during the event. The inspectors also reviewed technical specification requirements to ensure that Oyster Creek operated in accordance with its operating license.

The inspectors reviewed PPC data, control room logs, and discussed the event with Exelon personnel to gain an understanding of how operations personnel and plant equipment responded during the event. The inspectors evaluated Exelon's program and process associated with event response to ensure they adequately implemented station procedures OP-AA-108-114, "Post Transient Review" and OP-AA-106-101-1001, "Event Response Guidelines."

The inspectors also observed the PORC meeting prior to plant startup to evaluate whether Exelon understood the cause of the event and appropriately resolved issues identified during the event. The inspectors reviewed Exelon's post-trip review report (IR 911709) to gain additional information pertaining to the event, and ensure that human performance and equipment issues were properly evaluated and understood prior to plant startup.

b. Findings

No findings of significance were identified. See section 4OA3.5 for additional information on this event, including details on a self-revealing Green finding that was identified.

.4 (Closed) LER 05000219/2009-002-00, "Failure to Take the Appropriate Technical Specification Action When Primary Containment Isolation Valve Became Inoperable"

This license event report (LER) discussed an event that involved operations personnel not implementing TS 3.5.A.3, "Primary Containment Integrity," required actions within

four hours when primary containment isolation valve (PCIV) 'V-16-14' (reactor water cleanup (RWCU) heat exchanger inlet isolation valve) failed

to close on a RWCU heat exchanger outlet high temperature isolation signal on February 2. Operations personnel noted that 'V-16-1' (RWCU inlet isolation valve) did close, however 'V-16-14' did not close. Exelon personnel performed troubleshooting activities on the valve and identified high resistance across contacts in a relay which was utilized for both the non-safety (RWCU isolation) and safety (PCIV isolation) related isolation functions. Maintenance personnel burnished the contacts on the relay and returned the valve to an operable status shortly after troubleshooting activities on February 3.

Exelon's evaluation determined that the event occurred due to operations personnel not recognizing that the potential cause of the issue was due to a relay that was shared by the PCIV isolation logic circuit and thus did not take the appropriate technical specification required actions within four hours for a potentially inoperable PCIV. The inspectors reviewed this LER and the enforcement aspects of this finding are discussed in Section 4OA7 of this report. This LER is closed.

.5 (Closed) LER 05000219/2009-003-00, Manual Reactor Shutdown Caused by Loss of Cooling to Main Transformer

a. Inspection Scope

This LER discussed a manual reactor scram that occurred on April 25, when operations personnel performed a reactor shutdown due to a loss of cooling on the 'M1A' main power transformer. Additional information on this event is contained in section 4OA5.3 of this report. The inspectors reviewed this LER, Exelon's evaluation into this event, applicable internal and external operating experience (OE), and various Exelon procedures. This LER is closed.

b. Findings

Introduction. A self-revealing Green finding occurred when Exelon did not adequately evaluate OE regarding transformer cooling issues. Specifically, Exelon did not identify and correct a single point vulnerability (SPV) on the main transformer cooling system control circuitry. This resulted in a manual reactor scram in April 2009 when the 'M1A' main power transformer lost all cooling and could not be recovered. This finding was determined not to be a violation of NRC requirements. Exelon's corrective actions included modifying the cooling system control circuitry on the 'M1A' and 'M1B' main power transformer to address the SPV.

Description. On April 25, the 'M1A' main power transformer experienced a loss of cooling. In response to rising transformer temperatures, operations personnel began a power reduction in accordance with procedures. Based on recommendations from engineering personnel, operations performed a reactor shutdown (manual reactor scram) after it was determined that cooling could not be restored to the transformer within one hour. See section 4OA5.3 of this report for additional details.

Maintenance and engineering personnel inspected the 'M1A' main power transformer and performed troubleshooting activities. Exelon identified that the auxiliary control power transformer (CPT) for the cooling circuit failed as a result of a shorted coil on the #1 cooling contactor. This resulted in the loss of control power for the remaining pumps and fans in the cooling system. Troubleshooting also found an incorrectly rated fuse installed for protection of the CPT; however the faulted cooling contactor coil would still have resulted in a loss of all cooling to the transformer.

Exelon performed an evaluation (IR 911709) of this event and concluded that a SPV in the transformer cooling system control circuitry of the transformer was not identified and corrected. The evaluation stated and the inspectors noted that opportunities existed for Exelon to identify the SPV during reviews of internal and external OE by Exelon personnel. Specifically, in October 2002 (IR 126133) July 2005 (IR 349670), July 2007 (IR 646736), and May 2008 (IR 777554) internal and external OE reports were issued that discussed power transformer cooling issues. The evaluation also stated that an opportunity existed for Exelon personnel to identify the SPV on the cooling circuitry during review of the modification (engineering change request 09-0014) which replaced the 'M1A' transformer in February 2009. Exelon's procedure CC-AA-102, "Design Input and Configuration Change Impact Screening," states that the design of modifications shall identify existing SPVs and new SPVs embedded within the scope of the design change.

The inspectors noted that Exelon procedure LS-AA-115, "Operating Experience Program," states that engineering personnel should ensure that pertinent operating experience deemed relevant is implemented using effective corrective actions in accordance with procedure LS-AA-125, "Corrective Action Program," to prevent recurrence of problems and improve the condition of the system or component.

Exelon's corrective actions included replacing the CPT and the #1 cooling bank motor starter assembly, installing properly rated fuses, revising operations procedures, and modifying the cooling system control circuitry on the 'M1A' and 'M1B' main power transformer to address the SPV. The modification installed a backup independent control power supply, and added individual fuses for each cooling group so only one cooling group circuit could be lost on an electrical fault within the same cooling group circuit.

Analysis. The performance deficiency associated with this self-revealing finding involved Exelon not adequately evaluating OE regarding transformer cooling issues. Specifically, Exelon did not identify and correct a SPV on the main power transformers cooling system control circuitry. This resulted in a manual reactor scram in April 2009 when the 'M1A' main power transformer lost all cooling and could not be recovered. The inspectors determined that the performance deficiency was similar to the "not minor if" statement contained in example 4b of IMC 0612, Appendix E, "Examples of Minor Issues," because the performance issue resulted in a manual reactor scram. The finding was more than minor in accordance with IMC 0612, Appendix B (Section 1-3), "Issue Screening," because it was associated with the equipment performance attribute of the initiating events cornerstone and affected the objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during power operation.

In accordance with IMC 0609.04 (Table 4a), "Phase 1 – Initial Screen and Characterization of Findings," the finding was determined to be of very low safety significance (Green) because the finding did not contribute to both the likelihood of a reactor trip and the likelihood that mitigation equipment or functions would not be available.

The performance deficiency had a cross-cutting aspect in the area of problem identification and resolution, operating experience [IMC 0305, Aspect P.2(a)], because Exelon did not evaluate relevant internal and external OE to identify a SPV in the transformer cooling system.

Enforcement: The function of the main power transformer has an impact on overall plant risk. The 'M1A' main power transformer is not a safety related component, and therefore no violation of regulatory requirements occurred. Nonetheless, because the finding was of very low safety significance (Green) and Exelon entered this finding into their corrective action program in Corrective Action Program Condition Report IR 911709, this is identified as a finding. **(FIN 05000219/2009003-07, Ineffective Use of Operating Experience on Main Power Transformer Cooling System).**

4OA5 Other

.1 Quarterly Resident Inspector Observations of Security Personnel and Activities

a. Inspection Scope

During the inspection period, the inspectors conducted the following observations of security force personnel and activities to ensure they were consistent with Exelon security procedures and regulatory requirements relating to nuclear plant security. These observations took place during both normal and off-normal plant working hours. Specifically, the inspectors:

- Observed operations within the central and secondary alarm stations;
- Observed security officers on compensatory posts and in ready rooms;
- Observed security force shift turnover activities; and
- Observed security officers conducting access control activities.

b. Findings

No findings of significance were identified.

.2 Structural Monitoring Program for Meteorological Tower and Wooden Pole Program for License Renewal

a. Inspection Scope (IP71003)

The inspection scope included a follow-up of the licensee's commitment to include the Meteorological Tower Structures in the Structural Monitoring Program (SMP) implemented for the renewed operating license for the plant.

Commitment 14 states the SMP will be enhanced to include Meteorological Tower Structure Inspection and acceptance criteria that will be the same as those specified for other structures in the scope of this program.

The inspectors reviewed supporting documents to verify the enhancement of the SMP, and examined the results of inspections Exelon had performed. Also, the inspectors visited the tower site, toured associated structures, and visually examined structures and facilities to assess and compare the current condition with the documented inspection results.

The inspectors also observed that one of the wooden poles associated with emergency radio communications which was damaged in a brush fire incident had been replaced with a new pole. The damaged pole was left in place as it did not presently or potentially affect the safety and/or operability of the new pole.

The inspectors further observed that the emergency radio communication repeater installed on the Meteorological Tower was a back-up repeater and was not credited for Station Blackout or Appendix R safe shutdown conditions.

The inspectors verified overall that Exelon had met the commitment to include inspections of Meteorological Tower in the SMP, and that there was no adverse condition for the existing condition as documented Exelon.

b. Findings

No findings of significance were identified.

.3 Radioactive Material Control

a. Inspection Scope

The inspectors reviewed recent corrective action program documents and applicable licensee reviews associated with control of radioactive materials and unrestricted release of radioactive materials. The inspectors reviewed corrective action program condition reports (IR 932593, 909233, 883526, 909200, 905745, 887733, 883526, 877557, and 897663) to determine if issues were being properly identified, evaluated, and corrective actions were appropriately prioritized in the corrective action program for resolution. The review also consisted of determining if issues were repetitive. The inspectors discussed radioactive materials controls with radiation protection personnel including the radiation protection manager, radiation protection supervisors, and radiation protection technicians.

The review was against the criteria contained in 10 CFR 20, “Standards for Protection against Radiation,” and applicable Exelon procedures.

b. Findings

No findings of significance were identified.

4OA6 Meetings, Including Exit

Regional Administrator Site Visit & 2008 Annual Assessment Meeting. On May 28 a site visit was conducted by Mr. S. Collins, Regional Administrator for the NRC Region I office. During Mr. Collins' visit, he toured the plant and met with Exelon managers.

The NRC conducted a meeting with Exelon on May 28 to discuss NRC's assessment of safety performance at Oyster Creek for calendar year 2008. The meeting was open for public observation and included question and answer sessions between the public and NRC staff. A copy of the meeting notice, slide presentation, and a summary of the meeting can be found in ADAMS under accession reference numbers ML091330051, ML091320652, and ML091530199, respectively.

Resident Inspector Exit Meeting. On July 16, the inspectors presented their overall findings to members of Exelon's management led by Mr. M. Massaro, Site Vice President, and other members of his staff who acknowledged the findings. The inspectors confirmed that proprietary information reviewed during the inspection period was returned to Exelon.

4OA7 Licensee-Identified Violations

The following violations of very low safety significance (Green) or Severity Level IV were identified by Exelon and are violations of NRC requirements which meet the criteria of NRC Enforcement Policy for being dispositioned as an NCV.

- Technical Specification 3.5.A.3, "Primary Containment Integrity" requires that with one or more of the automatic containment isolation valves inoperable: maintain at least one isolation valve operable in each affected penetration that is open and within 4 hours: restore the inoperable valve(s) to operable status, isolate the affected penetration by use of at least one deactivated automatic valve secured in the isolation position, or isolate each affected penetration by use of at least one closed manual valve or blind flange. Contrary to this, on February 2, Exelon personnel did not identify that automatic containment isolation valve 'V-16-14' (reactor water cleanup (RWCU) heat exchanger inlet isolation valve) was inoperable and take the required actions as stated above.

  This violation was of very low safety significance (Green) because the finding did not represent an actual open pathway in the physical integrity of the reactor containment because the redundant PCIV 'V-16-1' was operable during the time period when 'V-16-14' was inoperable. This issue is described in corrective action program condition report IR 875329. Exelon's corrective actions included briefing operations personnel of this event and reinforcing proper technical rigor is applied when issues are identified.

- 10 CFR 50, Appx B Criterion V, "Instructions, Procedures, & Drawings," states in part, that activities affecting quality shall be prescribed by documented instructions or procedures of a type appropriate to the circumstance; and instructions or procedures shall include appropriate quantitative or qualitative acceptance criteria to determine that important activities have been satisfactorily accomplished. Contrary to this, Exelon did not have appropriate work instructions to identify a degraded

condition on the #2 EDG battery charger in November 2007, during a maintenance activity which involved inspection and cleaning of the battery charger. Specifically, the work instruction did not contain specific guidance or acceptance criteria to look for connections with signs of weakening (frayed wires) or heat damage as described in Exelon's performance center maintenance (PCM) guidance for battery chargers. The degraded condition went unnoticed until operations personnel identified a degraded voltage condition on the battery charger on March 23, during routine rounds. Additional troubleshooting by maintenance personnel identified that the battery charger had failed. This impacted the capability and availability of the EDG to perform its safety function.

This violation was of very low safety significance (Green) because the finding did not result in a loss of safety function for greater than the EDG's technical specification allowed outage time of seven days. This issue is described in corrective action program condition report IR 896256. Exelon's corrective actions included replacing the #2 EDG battery charger, performing an extent of condition review on the #1 EDG battery charger, and revising maintenance procedures to include specific inspection guidance for the battery chargers. The #2 EDG was returned to service and declared operable on March 24.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel
M. Massaro, Site Vice-President
P. Orphanos, Plant Manager
D. Dicello, Director, Work Management
J. Dostal, Director, Operations
R. Peak, Director, Engineering
R. Reiner, Director, Training
J. Vaccaro, Director, Maintenance
J. Barstow, Manager, Regulatory Assurance
T. Keenan, Manager, Security
R. Wiebenga, Senior Manager, System Engineering
H. Ray, Senior Manager, Design Engineering
M. McKenna, Shift Operations Superintendent
D. Peiffer, Manager, Nuclear Oversight
J. Kerr, Manager, Corrective Action Program
J. Kandasamy, Manager, Environmental/Chemistry Manager
J. Renda, Manager, Radiation Protection
S. Dupont, Regulatory Assurance Specialist
S. Quick, LOR Program Lead

Others:
R. Penny, State of New Jersey Bureau of Nuclear Engineering

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened
None

Opened/Closed

05000219/2009003-01	NCV	Medium Voltage Cables Maintained Submerged for Extended Period of Time (Section 1R06)
05000219/2009003-02	FIN	Inadequate Evaluation Results In Instrument Air Transient (Section 1R12)
05000219/2009003-03	NCV	Improper Solder Joint Causes Safety Related Station Battery Charger Failure (Section 1R12)
05000219/2009003-04	NCV	Non-Conservative Acceptance Criteria Specified In SBGTS Surveillance Procedure (Section 1R19)
05000219/2009003-05	NCV	Adverse Trend on #1 SBGTS Not Identified (Section 1R22**)**

05000219/2009003-06	NCV	Loss of Secondary Containment Integrity During Maintenance on Reactor Building Roof (Section 4OA2)
05000219/2009003-07	FIN	Ineffective Use of Operating Experience on Main Power Transformer Cooling System (Section 4OA5)

Closed

05000219/2009-002-00	LER	Failure to Take the Appropriate Technical Specification Action When Primary Containment Isolation Valve Became Inoperable (Section 4OA5)
05000219/2009-003-00	LER	Manual Reactor Shutdown Caused by Loss of Cooling to Main Transformer (Section 4OA5)

LIST OF DOCUMENTS REVIEWED

In addition to the documents identified in the body of this report, the inspectors reviewed the following documents and records.

Section 1R01: Adverse Weather Protection

Procedures

OP-OC-108-109-1001, “Preparation for Severe Weather T&RM for Oyster Creek”
OP-AA-108-111-1001, “Severe Weather and Natural Disaster Guidelines”
WC-AA-107, “Seasonal Readiness”
OP-OC-108-1001, “Preparation for Severe Weather T&RM for Oyster Creek”
ABN-37, “Station Blackout”
ABN-60, “Grid Emergency”
ABN-32, “Abnormal Intake Level”
OP-OC-108-109-1004, “Hurricane Staffing T&RM for Oyster Creek”
OP-AA-108-107-1001, “Station Response to Grid Capacity Conditions”

Condition Reports (IR)

635700	877396	797167	846248	884856	832651
925885	933815	933977	933986	840077	918733

Work Orders (AR)

A2218396

Other Documents

Exelon Letter, “Certification of 2009 Summer Readiness”, dated May 15, 2009

Section 1R04: Equipment Alignment

Procedures

308, “Emergency Core Cooling System Operation”
310, “Containment Spray System Operation”
340.3, 125 Volt DC Distribution System

Drawings
BR2005, “Emergency Service Water System”
GE 885D781, “Core Spray System Flow Diagram”
GE 148F740, “Flow Diagram – Containment Spray System”

Condition Reports (IR)
923921 936634 833488 874285

Work Orders (AR)
A2208552 A2207535 A2101472 A2225234 A2089986 A2061061
A2100285 A2159759 A2204139

Section 1R05: Fire Protection
Procedures
ABN-29, “Plant Fires”
101.2, “Oyster Creek Site Fire Protection Program”
CC-AA-211, “Fire Protection Program”
OP-OC-100-101, “Shift Coverage Guidelines”
333, “Plant Fire Protection System”

Condition Reports (IR)
912144 913381 921547

Other Documents
Pre-fire Plan, “Condenser Bay Area (TB-FZ-11E)”
Pre-fire Plan, “Reactor Building (-19’ Elevation) RBEDT Room (RB-FZ-1F2)”
Pre-fire Plan, “Reactor Building (-19’ Elevation) Northeast Corner Room (RB-FZ-1F4)”
Pre-fire Plan, “Intake Structure (CW-FA-14)”
Pre-fire Plan for 23 foot (If used)
NFPA 10, “Standard for Portable Fire Extinguishers”

Section 1R06: Flood Protection Measures
Procedures
ER-AA-3003, “Cable Condition Monitoring Program”

Condition Reports (IR)
922187 645011 910538 918937

Work Orders (AR)
R2119009 R2116819 C2010972

Other Documents
Modification OC MD-H352-001, “Turbine Building Floor & Equipment Drains Sump Pump Modification”
Exelon Generic Letter 2007-01 Response, dated May 7, 2007
Cable System Assessment Report 2009-04
Cable System Assessment Report 2009-09
NRC Inspection Report 05000219/2003005, dated February 12, 2004

Section 1R07: Heat Sink Performance

Procedures

ER-AA-340, "GL 89-13 Program Implementing Procedure"
ER-AA-340-1001,"Oyster Creek Generic Letter 89-13 Program Basis Documents"
ER-AA-340-1002, "Service water Heat Exchanger and Component Inspection Guide"
2400-SMM-3214.02, "Containment Spray Heat Exchanger Cleaning and Assembly"
309.2, Reactor Building Closed Cooling Water System, Rev. 79
322, Service Water System, Rev. 72
326, Chlorination System, Rev. 76
607.4.016, CS/ESW System I Pump Operability & Quarterly In Service Test, Rev. 15
ABN-18, Service Water Failure Response, Rev. 4
ABN-19, RBCCW Failure Response, Rev. 8
ABN-32, Abnormal Intake Level, Rev. 17
CY-AA-120-410, Circulating / Service Water Chemistry, Rev. 1
ER-OC-340-1001, Oyster Creek Generic Letter 89-13 Program Basis Document, Rev. 0

Drawings:

BR 2005, Emergency Service Water System, Sh. 2, Rev. 98
BR 2005, Emergency Service Water System, Sh. 4, Rev. 80
BR 2006, Reactor Building Closed Cooling Water System, Rev. 73
FP SE-5419, Chlorination System, Rev. 58
GE 148F740, Containment Spray System, Rev. 43

Condition Reports (IR):

618930	674860	739993	763146	790838	793831
869541	874285	886596	911493	926395	930976
931726					

Work Order (AR)

R2091245 A0703678

Other Documents

Evaluation A0703678- Evaluate Data Collected During the Test Performed in 2009
HX/Component Inspection Data Sheet – April 21, 2009 (Containment Spray System 2 HX)
Engineering Evaluation #0004-98, "ESW/CS HT Exch. Cleanliness Testing Data Acquisition System Directions"4556
A0703677, Evaluate Data Collected During Heat Exchanger Test Performed in 2008, 3/4/08
A0703677, Evaluate Data Collected During Heat Exchanger Test Performed in 2007, 2/20/07
C-1302-241-E120-078, Containment Spray Heat Exchanger Performance Evaluation, Rev. 1
Program Health Report, GL 89-13 Program, 2nd, 3rd & 4th Quarter 2008, 1st Quarter 2009
System Health Report, Chlorination System, 3rd & 4th Quarter 2008, 1st Quarter 2009
System Health Report, Service Water System, 3rd & 4th Quarter 2008, 1st Quarter 2009

Section 1R11: Licensed Operator Requalification Program

Procedures

ABN-1,"Reactor Scram"
EMG-3200.01A, "RPV Control No ATWS"
EMG-3200.01B, "RPV Control with ATWS"
EMG-3200.02, "Primary Containment Control"

Other Documents
EOP User's Guide (2000-BAS-3200.02)

Section 1R12: Maintenance Effectiveness

Procedures
ER-AA-310, "Implementation of Maintenance Rule"
ER-AA-310-1005, "Maintenance Rule - Disposition Between (a)(1) and (a)(2)"
LS AA-125-1003, "Apparent Cause Evaluation Manual"
LS-AA-125, "Corrective Action Program (CAP) Procedure"
MA-AA-716-230-1003, "Thermography Program Guide"
MA-OC-741-101, "Diesel Generator Inspection (24 month) – Electrical"
MA-MA-716-009, "Preventive Maintenance (PM) Work Order Process
MA-AA-716-210-1001, "Performance Centered Maintenance (PCM) Templates"
MA-AA-716-010, "Maintenance Planning"
MA-AA-716-100, "Maintenance Alterations Process"
MA-AA-716-011, "Work Execution & Close Out"
MA-AA-1000, "Conduct of Maintenance Manual"
MA-AA-716-012, "Post Maintenance Testing"
NO-AA-300, "Inspection Planning and Execution of Quality Inspection Activities"
NO-AA-30, "Independent Inspection Process Description"
NO-AA-300-1001, "Nuclear Oversight Independent Inspection Plan"
HU-AA-101, "Human Performance Tools and Verification Practices"
HU-AA-1211, "Briefings – Pre-job, Heightened Level of Awareness, Infrequent Plant Activity and Post-job briefings"
RAP-9XF2d, "BUS C UV"
RAP-M7b, "INSTR AIR DRYER FAIL"
ABN-35, "Loss of Instrument Air"
TQ-AA-161, "Maintenance Training Program"
634.2.013, "C2 Battery Charger Load Test"

Drawings
1011836, Dryer, DEA T800, DEA4, Special

Condition Reports (IR)

903350	905661	901479	896256	906861	906909
902944	853007	852339	903338		

Work Orders (AR)

M2221057	R2084731	C2021037	R2119748	R2093636	R2120019
A2191073	A2084493				

Other Documents
NEI 93-01, "Industry Guideline for monitoring the Effectiveness of Maintenance at Nuclear Power Plants"
VM-OC-2784, "Pneumatic Products 800DEA Heat Regenerated Dryer with Advanced Dryer Controller (ADC+)"
VM-OC-5676, "Larmarche Mfg Company Model A-11 & A-12 Battery Charger Instruction Manual"
CPS 8500.0, "Soldering Electrical Connections"
K-EC28101, "Advanced Soldering: PACE Soldering Course©"
EC-50206, "Basic Electricity/Soldering"

VM-OC-0526, “Battery Charger C-1 & C-2”
5050-0083, “PACE Workbook: Basic Soldering for Electronics”
6031-2100, “PACE Trainee Handbook: Rework and Repair for Electronics”
5050-0082, “PACE Workbook: High Reliability Interconnection Technology”
903350, “Apparent Cause Report: Entry into ABN-35, Loss of Instrument Air Due to Purge Valve Failure.”
Pneumatic Products Specification Sheet for Air Dryer Model 800DEASP-A4B1-PP-Special

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Procedures
ER-AA-600-1042, “On-line Risk Management”
ER-AA-600-1021, “Risk Management Application Methodologies”
ER-AA-600-1014, “Risk Management Configuration Control”
ER-AA-600-1011, “Risk Management Program”
WC-OC-101-1001, “On-line Risk Management and Assessment”

Other Documents
Unit Supervisor Turnover Sheet for May 26, 2009

Section 1R15: Operability Evaluations

Procedures
OP-AA-108-115, “Operability Determination”
OP-AA-108-115-1002, “Supplemental Consideration for On-Shift Immediate Operability Determinations (CM-1)
LS-AA-120, “Issue Identification and Screening Process”
645.6.017, “Fire Barrier Penetration Surveillance”
116, “Surveillance Testing Program”
116.1,”Surveillance testing Implementation Program”
CY-OC-130-130, “Boron Analysis by Titration”
CY-OC-120-530, “Liquid Poison System Sampling”
609.4.011, “’B’ Isolation Condenser Make-up Line Check Valve In Service Test”
651.4.001, “Standby Gas Treatment System Test”

Drawings
BR 2004, “Demineralized & Condensate Water Transfer System”
GE 148F262, “Emergency Condenser System”

Condition Reports (IR)

911709	912067	912847	912856	892126	905353
911878	904708	902664	919939	921157	921313
921323	914224	936877	898893	937248*	

Work Orders (AR)

R2122322	R2117566	R2125509	R2131307	R2135295	R2055472
R2141405	A2211659	R2142390	R2138642	R2139854	R2141514
R2138299	R2139854	R2141514			

Other Documents
NRC Inspection Manual - Part 9900 Technical Guidance, “Operability Determinations & Functionality Assessments for Resolution of Degraded or Nonconforming Conditions Adverse to Quality or Safety”

Exelon PCM Template for "Power Transformers – Oil Filled"
Dissolved Gas Analysis Results for the M1A Transformer Oil for March and April 2009
ECR OC 03-00851-001, "480 Volt Switchgear – Appendix R Modification"
Oyster Creek Technical Specifications Section 1.24, "Surveillance Requirements"
Oyster Creek Technical Specifications Section 3.7, "Auxiliary Electrical Power"
Oyster Creek Technical Specifications Section 3.2, "Reactivity Control"
Oyster Creek Technical Specifications Section 3.8, "Isolation Condenser"
NRC Safety Evaluation Amendment Number 138, dated February 23, 1990
919939-03, Quick Human Performance Investigation
C-1302-620-5350-001, "SBGT Flow Loop Instrument Accuracies"
C-1302-822-5360-045, "SGTS Cooling Air Flow Requirement"
SDBD-OC-822, "Design Basis Document for Standby Gas Treatment System/Secondary Containment."
TWFR A00640, "SGTS New HEPA dP Curves", dated February 27, 1986

Section 1R18: Plant Modifications

Procedures

651.4.001, "Standby Gas Treatment Test"
RAP-L1b, "TRAIN A FLTRS dP HI/HTR CKT FAIL"
RAP-L4b, "TRAIN B FLTRS dP HI/HTR CKT FAIL"
RAP-R5e,"M1A WDG TEMP HI"
RAP-R6e, "M1A CLG PWR FAIL"
RAP-R7e,"M1A TROUBLE"
SY-AA-101-106, "Control and Classification of Safeguards Information, Safeguards Information-Modified Handling, and Sensitive Unclassified Non-Safeguards Information"

Condition Reports (IR)

892752 924629 925805

Work Orders (AR)

A2222767 C2021125

Other

OC-2009-S-0078, 50.59 Screening Form for Standby Gas Treatment System Test (651.4.001 Rev. 61)
Procedure Approval Form, "651.4.001 Rev 61, RAP-L1b Rev 1 & RAP-L4b Rev 2"
Oyster Creek Technical Specifications Section 3.5.B, "Secondary Containment"
Oyster Creek Technical Specifications Section 4.5.H, "Standby Gas Treatment System"
Oyster Creek Technical Specifications Figure 4.5.1, "Maximum Allowable Pressure Drop For HEPA Filters"
OC-09-00359-001, "M1A Transformer Cooling Control Circuit Modification"
Vendor Manual VM-OC-2906,"Main Transformer M1A"
Vendor Manual VM-OC5095, "Main Power Transformers (GEK-2695)"
IEEE Std C57.91-1995, "IEEE Guide for Loading Mineral-Oil-Immersed Transformers"

Section 1R19: Post-Maintenance Testing

Procedures

MA-AA-716-012, "Post Maintenance Testing"
OP-MA-109-101, "Clearance and Tagging"
ADAA-101, "Processing of Procedures and T&RMs"

607.4.016, “Containment Spray and Emergency Service Water System I Pump Operability and Quarterly Inservice Test”
651.4.001, “Standby Gat Treatment System Test”
651.3.002, “SGTS Particulate Filter In-Place Leak Test”
609.3.002, “Isolation Condenser Isolation Test and Calibration – A1/B1 Sensors First”
609.4.001, “Isolation Condenser Valve Operability and In Service Test
665.5.006, “Local Leak Rate Tests”

Drawings
BR 3029, “Emergency Condenser System Electrical Elementary Diagram”

Condition Report (IR)

905959	904415	930657*	927078	923558	930657
924629	914369				

Work Order (AR)

M2221673	C2020997	C2016804	R2138054	C2021359	R2122568
R2137983	C2021298	A2224936	C2019757		

Other
Fire Barrier Seal Installation/Repair Data Sheet, dated April 16, 2009 (for WO C2016804)
905959-03, “Common Cause Analysis: CR120A Relay Failures”
Oyster Creek Technical Specifications Section 4.1, “Protective Instrumentation”
Oyster Creek Technical Specifications Section 3.8, “Isolation Condenser”
Oyster Creek Technical Specifications Section 4.5, “Containment System”
Oyster Creek Technical Specifications Section 4.8, “Isolation Condenser”
Oyster Creek Technical Specifications Figure 4.5.1, “Maximum Allowable Pressure Drop for HEPA Filters”
Generic Letter 96-01, “Testing of Safety Related Logic Circuits”
Procedure Approval Form, “651.4.001 Revision 56”, dated July 12, 2007.
SDBD-OC-822, “Design Basis Document for Standby Gas Treatment System/Secondary Containment.”
Regulatory Guide 1.52, “Design, Inspection and Testing Criteria for Air Filtration and Adsorption Units of Post-Accident Engineered-Safety-Feature Atmosphere Cleanup System in Light-Water-Cooled Nuclear Power Plants”
ASME AG-1, Section FC, “HEPA Filters”
Control Room Narrative Logs, dated May 1, 2009

Section 1R20: Refueling and Outage Activities

Procedures
201, "Plant Startup"
203, “Plant Shutdown”
305, “Shutdown Cooling System Operation”
OP-AA-108-108, “Unit Restart Review”

Condition Report (IR)

914199	914224	914218	913746	913953	914052
914161	914168	914159	914078	914149	913492
913487	913439	913387	912997	912530	912827
912508	912205	912228	912415	912291	912289
912272	911878	912075	912144	912159	912205
913499	911786				

Other
NRC Preliminary Notification of Event PNO-I-09-002, dated April 27, 2009
NRC Preliminary Notification of Event PNO-I-09-002A, dated May 4, 2009
Risk Analysis Report for 1R20 Forced Outage

Section 1R22: Surveillance Testing

Procedures
SA-AA-129, "Electrical Safety"
MA-AA-1000, "Conduct of Maintenance"
602.4.002, "MSIV Closure and IST Test"
609.3.002, "Isolation Condenser Isolation Test and Calibration – A1/B1 Sensors First"
609.4.001, "Isolation Condenser Valve Operability and In Service Test"
619.3.005. "High Flow in the Main Steam Line Test and Calibration"
636.4.015, "Diesel Generator #1 Fast Start Test"
651.4.001, "Standby Gas Treatment System Test"
ER-AA-2003, "System Performance Monitoring and Analysis"
ER-AA-2030, "Conduct of Plant Engineering Manual"

Drawings
BR 3029 Sh 2A, "Emergency Condenser System, Electrical Elementary Diagram, Emergency Cond. Isolation Control, NE01-B & Recirc Pump Trip Drive Relays"

Condition Reports (IR)

912289	912291	912272	905959	904415	927006
923558	923620	923631	926650		

Work Orders (AR)

R2123435	R2122568	C2020997	R2133794	R2142894

Other Documents
NRC Inspection Manual Part 9900 Technical Guidance, "Maintenance- Preconditioning of Structures, Systems, and Components Before Determining Operability"
IST Trending Graphs for V-1-10, V-1-7 and V-1-8, dated May 1, 2009
Generic Letter 96-01, "Testing of Safety-Related Logic Circuits"

Section 4OA1: Performance Indicator Verification

Other Documents
NRC Inspection Report 05000219/2008003, dated July 31, 2008
NRC Inspection Report 05000219/2008004, dated October 29, 2008
NRC Inspection Report 05000219/2008005, dated January 27, 2009
NRC Inspection Report 05000219/2009002, dated May 5, 2009
LER 2008-001-00, "Automatic Reactor Shutdown Caused by Main Transformer Failure"
LER 2009-001-00, "Automatic Reactor Shutdown Caused by Main Transformer Failure"
LER 2009-002-00, "Failure to Take the Appropriate Technical Specification Action When Primary Containment Isolation Valve Became Inoperable"

Section 4OA2: Identification and Resolution of Problems

Procedures
LS-AA-125, "Corrective Action Program (CAP) Procedure"
312.10, "Secondary Containment Control"

HU-AA-1211,"Briefings-Pre-Job, Heightened Level of Awareness, Infrequent Plant Activity, and Post-Job Briefings"
MA-AA-716-003, "Tool Pouch/Minor Maintenance"
MA-AA-716-010, "Maintenance Planning"

Condition Reports (IR)
901285 930183

Work Orders (AR)
A2214101

Other Documents
Control Room Narrative Logs, dated April 1

Section 4OA3: Event Followup

Procedures
RAP-D8b, "NRHX Outlet Temp HI"
ABN-1,"Reactor Scram"
EMG-3200.01A, "RPV Control No ATWS"
LS-AA-115, "Operating Experience Program"
LS-AA-115-1001, "Processing of Significance Level 1 OPEX Evaluations"
CC-AA-102, "Design Input and Configuration Change Impact Screening"

Condition Reports (IR)
646736 875329 875501 910085 911709 750545
881032

Other Documents
NUREG-1022, "Event Reporting Guidelines 10 CFR 50.72 and 50.73"
Control Narrative Logs, dated April 21, 2009
Process Plant Computer Data Point 24, 25, 26, 27 (Main Condenser Vacuum), dated April 21
LER 2009-002-00, "Failure to Take the Appropriate Tech Spec Action When primary Containment Isolation Valve Became Inoperable"
LER 2009-003-00, "Manual Reactor Shutdown Caused by Loss of Cooling to Main Transformer"
NRC Event Notification 45021, "Manual Scram Following Loss of Cooling to Main Transformer"
NRC Event Notification 44993, "Offsite Notification Due to Potential Release of Tritium"
Post Transient Response Report (IR 911709)
Vendor Manual VM-OC-2906, "Forced-Oil-Air Cooling Equipment GEI-70389C"
Control Room Narrative Logs, dated April 25-April 26, 2009
Preliminary Notification PNO-I-09-002, "Shutdown Greater Than 72 Hours: Manual Reactor Scram Following Loss of Cooling to Main Transformer" (ML091170664)
Preliminary Notification PNO-I-09-002A, "UPDATE - Shutdown Greater Than 72 Hours: Manual Reactor Scram Following Loss of Cooling to Main Transformer" (ML091240417)

Section 4OA5: Other

Work Order (WO)
R2120543

Condition Reports (IR)
908689 794845 755007

Other Documents

AmerGen letter to the NRC, dated December 9, 2005

Response to Requests for Additional Information, License Renewal Application (TAC No MC7624), RAI 2.1.5.2-1, RAI2.1.5.2-2, RAI2.5.1.15-1

Appendix A to RAI response, Commitment 14

LIST OF ACRONYMS

ABN	Abnormal Operating Procedure
AC	Alternating Current
AOG	Augmented Off Gas
BWR	Boiling Water Reactor
CDF	Core Damage Frequency
CFR	Code of Federal Regulations
CPT	Control Power Transformer
CS	Containment Spray
dP	Differential Pressure
EAL	Emergency Action Level
ECR	Engineering Change Request
EDG	Emergency Diesel Generator
EOP	Emergency Operating Procedure
EPRI	Electric Power Research Institute
ESW	Emergency Service Water
Exelon	Exelon Generation Company, LLC
FIN	Finding
HEPA	High Efficiency Particulate Air
IST	Inservice Test
IMC	Inspection Manual Chapter
IPEEE	Individual Plant Examination for External Events
LER	License Event Report
LERF	Large Early Release Frequency
LOIA	Loss of Instrument Air
MG	Motor Generator
MSIV	Main Steam Isolation Valve
NEI	Nuclear Energy Institute
NCV	Non-cited Violation
NRC	Nuclear Regulatory Commission
NRHX	Non-regenerative Heat Exchanger
OE	Operating Experience
Oyster Creek	Oyster Creek Generating Station
PARS	Publically Available Records
PCIV	Primary Containment Isolation Valve
PCM	Performance Centered Maintenance
PI	Performance Indicator
PORC	Plant Onsite Review Committee
PSIG	Pounds per Square Inch (Gage)
RBCCW	Reactor Building Closed Cooling Water
RWCU	Reactor Water Clean Up
SDC	Shutdown Cooling

SDP	Significance Determination Process
SBGTS	Standby Gas Treatment System
SJAE	Steam Jet Air Ejector
SMP	Structural Monitoring Program
SPV	Single Point Vulnerability
SRA	Senior Risk Analyst
SSC	Systems. Structures and Components
SSFF	Safety System Functional Failure
TBCCW	Turbine Building Closed Cooling Water
UFSAR	Updated Final Safety Analysis Report
WO	Work Order