UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
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November 3, 2009

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

SUBJECT: LIMERICK GENERATING STATION - NRC INTEGRATED INSPECTION REPORT 05000352/2009004 AND 05000353/2009004

Dear Mr. Pardee:

On September 30, 2009, the U. S. Nuclear Regulatory Commission (NRC) completed an inspection at your Limerick Generating Station Units 1 and 2. The enclosed integrated inspection report documents the inspection results which were discussed on October 16, 2009, with Mr. C. Mudrick and other members of your staff.

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

This report documents two NRC-identified findings of very low safety significance (Green). These findings were determined to involve violations of NRC requirements. Additionally, a licensee-identified violation which was determined to be of very low safety significance is listed in this report. However, because of the very low safety significance and because they are entered into your corrective action program (CAP), 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 in this report, you should provide a response within 30 days of the date of this inspection report, with basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administration, Region I; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Limerick facility. In addition, if you disagree with the characterization of the cross-cutting aspect of any finding on 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 1 and the NRC Senior Resident Inspector at the Limerick facility. The information you provide will be considered in accordance with Inspection Manual Chapter 0305.

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Sincerely,

/RA/

Paul G. Krohn, Chief
Projects Branch 4
Division of Reactor Projects

Docket Nos: 50-352, 50-353
License Nos: NPF-39, NPF-85

Enclosure: Inspection Report 05000352/2009004 and 05000353/2009004
w/Attachment: Supplemental Information

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Sincerely,
/RA/
Paul G. Krohn, Chief
Projects Branch 4
Division of Reactor Projects

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U. S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket Nos:	50-352, 50-353
License Nos:	NPF-39, NPF-85
Report No:	05000352/2009004 and 05000353/2009004
Licensee:	Exelon Generation Company, LLC
Facility:	Limerick Generating Station, Units 1 & 2
Location:	Sanatoga, PA 19464
Dates:	July 1, 2009 through September 30, 2009
Inspectors:	E. DiPaolo, Senior Resident Inspector N. Sieller, Resident Inspector J. Kulp, Senior Resident Inspector N. Lafferty, Reactor Inspector J. Lilliendahl, Reactor Inspector T. Moslak, Health Physicist E. Torres, Project Engineer
Approved by:	Paul G. Krohn, Chief Projects Branch 4 Division of Reactor Projects

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SUMMARY OF FINDINGS

IR 05000352/2009004, 05000353/2009004; 07/01/2009 - 09/30/2009; Limerick Generating Station, Units 1 and 2; Maintenance Effectiveness, Problem Identification and Resolution.

The report covered a three-month period of inspection by resident inspectors and announced inspections by regional reactor inspectors. Two Green findings were identified, both of which were non-cited violations (NCVs). The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process (SDP)." Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. Cross-cutting aspects associated with findings are determined using IMC 0305, "Operating Reactor Assessment Program," dated August 2009. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight," Revision 4, dated December 2006.

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green. The inspectors identified a Green NCV of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," for failure to establish a test program for all safety-related 480 volt motor control unit (MCU) circuit breakers to assure that necessary testing was performed to demonstrate that they would perform the safety-related function in service. Specifically, in 2004, Exelon inappropriately classified certain safety-related 480 volt molded-case circuit breakers as run-to-failure in the Performance Centered Maintenance (PCM) process, which resulted in the breakers receiving no planned preventive maintenance or testing. Exelon entered this issue into the Corrective Action Program (CAP) for resolution as Issue Report (IR) 948232. Exelon's corrective actions included: reclassifying all safety-related 480 volt MCUs as either "critical" or "non-critical," a formal review of the vendor's technical bulletin for applicability; and an extent-of-condition review of all direct current MCUs and 4 kilovolt circuit breakers. Also, preventive maintenance and testing was planned for all in-service 480 volt MCUs that had gone overdue because they were inappropriately classified as "run-to-failure."

  This finding is more than minor because, if left uncorrected, the performance deficiency would lead to a more significant safety concern. Specifically, the installed molded case circuit breakers classified as run-to-failure had received no periodic planned maintenance or tests and were beyond the manufacturer's design life. Based on operating experience, this would result in a breaker being slow to trip or sticking in the "on" position after an over-current condition. The inspectors assessed the finding using Phase 1 of IMC 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings" and determined the finding to be of very low safety significance because the issue was a qualification deficiency confirmed not to result in loss of operability per "Part 9900, Technical Guidance, Operability Determination Process for Operability and Functional Assessment." Since the change to the PCM process was made in 2004, the inspectors determined that this finding was not reflective of current licensee performance and, therefore, did not have a cross-cutting aspect. (Section 1R12)

- Green. The inspectors identified a Green NCV of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," for failing to correct a condition adverse to quality associated

with the performance of thermography on safety-related breakers. Specifically, although Exelon identified that the failure to perform thermography on breakers in a loaded condition was a causal factor for an electrical fault that occurred in January 2009, Exelon did not implement proper corrective actions to ensure that applicable future thermography examinations would be conducted while the equipment was in a loaded condition. Exelon entered this issue into the CAP as IR 874599, Assignment 58. Corrective actions included adding 48 breakers to the list of breakers that will be loaded prior to thermography and creating an assignment to formally assess the remaining breakers that may not receive routine thermography due to not being in a loaded condition.

The finding was more than minor because it was associated with the equipment performance attribute of the Mitigating Systems cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The inspectors assessed the finding using Phase 1 of IMC 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings" and determined the finding to be of very low safety significance because it was not a design or qualification deficiency, did not represent a loss of system safety function, and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. This finding has a cross-cutting aspect in the area of Problem Identification and Resolution, Corrective Action Program, because Exelon did not take appropriate corrective actions to address a safety issue [P.1(d)]. Specifically, although the failure to perform thermography on breakers in loaded conditions was identified as a causal factor for an electrical fault, actions were not taken in a timely manner to ensure loaded conditions for applicable future thermography examinations. (Section 4OA2.2)

B. Licensee-Identified Violations

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

REPORT DETAILS

Summary of Plant Status

Unit 1 began the inspection period operating at full rated thermal power (RTP). On September 11, operators performed a planned power reduction to approximately 65 percent to facilitate main turbine and main steam valve testing, control rod scram time testing, a control rod sequence exchange, and balance of plant maintenance. The unit returned to full RTP on September 13. Unit 1 remained at full RTP for the remainder of the inspection period.

Unit 2 began the inspection period operating at full RTP. On September 5, operators performed a planned power reduction to approximately 74 percent to facilitate main turbine and main steam valve testing, control rod scram time testing, and a control rod sequence exchange. Power was returned to full RTP on September 6. On September 15, operators initiated an unplanned power reduction to approximately 90 percent in response to a main turbine electro-hydraulic control system fluid leak. Power was further reduced to 65 percent on September 16 to facilitate repairs. Unit 2 was returned to full RTP later that day. Unit 2 remained at full RTP for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01 - 1 sample)

Site Imminent Weather Conditions

a. Inspection Scope

The inspectors evaluated implementation of adverse weather preparation procedures as a result of severe thunderstorms and associated high winds experienced on August 18. The inspectors verified that Exelon entered the appropriate procedures and conducted walkdowns of the site, as necessary, to ensure plant equipment would not be affected by the adverse weather. The inspectors verified that operators properly assessed the increase to online risk due to the severe thunderstorm warning. Following the storm, the inspectors ensured that emergency response capabilities were not impacted by the storm and reviewed issues entered into the CAP to verify that they were properly characterized for resolution. Documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment

Partial Walkdown (71111.04Q - 3 samples)

a. Inspection Scope

The inspectors performed partial walkdowns of the plant systems listed below to verify operability following realignment after a system outage window or while safety-related

equipment in the opposite train was inoperable, undergoing surveillance testing, or potentially degraded. The inspectors used Technical Specifications (TS), Exelon operating procedures, plant piping and instrumentation diagrams (P&ID), and the Updated Final Safety Analysis Report (UFSAR) as guidance for conducting partial system walkdowns. The inspectors reviewed the alignment of system valves and electrical breakers to ensure proper in-service or standby configurations as described in plant procedures and drawings. During the walkdowns, the inspectors evaluated the material condition and general housekeeping of the systems and adjacent spaces. The documents reviewed are listed in the Attachment. The inspectors performed walkdowns of the following areas:

- Unit 1 'B' core spray loop when 'A' loop was out of service (OOS);
- '0A' standby gas treatment system (SGTS) when '0B' was OOS; and
- D21 emergency diesel generator (EDG) following a monthly operability run.

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05Q - 5 samples)

Fire Protection - Tours

a. Inspection Scope

The inspectors conducted a tour of the five areas listed below to assess the material condition and operational status of fire protection features. The inspectors verified that combustible materials and ignition sources were controlled in accordance with Exelon's procedures. Fire detection and suppression equipment was verified to be available for use, and passive fire barriers were verified to be maintained in good material condition. The inspectors also verified that station personnel implemented compensatory measures for OOS, degraded, or inoperable fire protection equipment in accordance with the station's fire plan. The documents reviewed are listed in the Attachment. The inspectors toured the following areas:

- Unit 2 reactor core isolation cooling pump room, elevation 177, fire area 56;
- Unit 2 high pressure coolant injection (HPCI) pump room, elevation 177, fire area 57;
- D21 EDG and fuel oil tank room, elevation 217, fire area 83;
- D11 emergency 4kV switchgear room, elevation 239, fire area 13; and
- D14 emergency 4kV switchgear room, elevation 239, fire area 14.

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures (71111.06 - 1 sample)

a. Inspection Scope

The inspectors performed an inspection of underground Manhole 95. The underground manhole contained electrical cabling to risk significant systems. The inspectors

reviewed the UFSAR and related design basis documents to identify the requirements for the manhole design. Cable support trays and cable insulation were inspected for material condition. The inspectors observed flood protection features to assess their ability to minimize the impact of a flooding event. In addition, the inspectors reviewed items entered in the licensee's CAP related to conditions discovered during other manhole inspections. The inspectors assessed whether the discovered conditions had any adverse impact on operability and whether appropriate corrective actions were planned. The documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification Program (71111.11Q - 1 sample)

Resident Inspector Quarterly Review

a. Inspection Scope

On July 21, 2009, the inspectors observed the 'D' shift operating crew during a licensed operator requalification simulator evaluation. The simulator scenario tested the operators' ability to respond to a toxic gas leak, a failure of the reactor protection system, and an unisolable reactor coolant system leak complicated by emergency core cooling system failures. The inspectors observed licensed operator performance including operator critical tasks, which are required to ensure the safe operation of the reactor and protection of the nuclear fuel and primary containment barriers. The inspectors also assessed crew dynamics and supervisory oversight to verify the ability of operators to properly identify and implement appropriate TS actions, regulatory reports, emergency event declarations, and notifications. The inspectors observed training instructor critiques and assessed whether appropriate feedback was provided to the licensed operators. The documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12Q - 3 samples)

a. Inspection Scope

The inspectors evaluated Exelon's work practices and follow-up corrective actions for three issues within the scope of the maintenance rule. The inspectors reviewed the performance history of these structures, systems, and components (SSCs) and assessed the effectiveness of Exelon's corrective actions, including any extent-of-condition determinations to address potential common cause or generic implications. The inspectors assessed Exelon's problem identification and resolution actions for these issues to evaluate whether Exelon had appropriately monitored, evaluated, and dispositioned the issues in accordance with Exelon procedures and the requirements of 10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance." In addition, the inspectors reviewed the maintenance rule classifications, performance criteria, and goals for these SSCs and evaluated whether they appeared

reasonable and appropriate. The documents reviewed are listed in the Attachment. The inspectors reviewed the following samples:

- IR 874599, Loss of 480 volt motor control center, D224-R-G;
- IR 853914, Functional failure determination for control room emergency fresh air system (CREFAS) charcoal; and
- IR 866263, EDG D24 tachometer oscillations.

b. Findings

Introduction: The inspectors identified a Green NCV of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," for failure to establish a test program for all safety-related 480 volt motor control unit circuit breakers to assure that necessary testing was performed to demonstrate that they would perform the safety-related function in service.

Description: During the review of Exelon's actions to address a loss of power event to 480 volt MCC D224-R-G (IR 874599) on January 31, 2009, the inspectors questioned the classification of some 480 volt MCC motor control units (MCUs) in Exelon's PCM process. The PCM process was established in 2004 to identify effective preventive maintenance activities for components to minimize consequential failures. Prior to the creation of the PCM process, all 480 volt MCUs received periodic maintenance and testing. However, when the PCM process was established, Exelon classified each 480 volt MCU based solely on the function of its load. As a result, 61 safety-related 480 volt MCUs supplying non-safety-related loads from safety buses were classified as "run-to-failure." According to MA-AA-716-210, "Performance Centered Maintenance Process," a run-to-failure component was defined as a component for which the risks and consequences of failure were acceptable without any predictive or repetitive maintenance being performed, and there was not a simple cost-effective method to extend the useful life of the component. Per the process, these components received no periodic preventive maintenance or testing and were to be run until corrective maintenance was required.

The inspectors noted that the MCUs contained molded-case circuit breakers which were designed to protect the associated safety-related 480 volt MCCs from load-side faults, as described in UFSAR Section 8.3.1.1.2.11, "Electric Circuit Protection." If a fault were to occur on the load-side of the circuit, and the molded case circuit breaker failed to clear the fault, the fault would be cleared by the upstream load center supply breaker for the associated MCC. This would result in a loss of power to the safety-related 480 volt MCC and could result in inoperable TS equipment, a plant transient, and/or a unit shutdown. In addition, on a loss-of-coolant-accident initiation signal, these breakers are sent a trip signal to strip the busses to avoid overloading the EDG. The inspectors concluded that because the molded-case circuit breakers were necessary for reactor safety, the breaker component of the MCU, at the very least, should not have been classified as "run-to-failure." Instead, the molded-case circuit breakers should have been classified as "critical" or "non-critical." The inspectors noted that components designated "critical" or "non-critical" in accordance with MA-AA-716-210 receive periodic preventive maintenance, which includes testing that would have assured the ability of the breaker to perform the safety-related isolation function.

The inspectors noted that applicable operating experience existed regarding aging of molded-case circuit breakers. Specifically, many of the installed 480 volt molded-case circuit breakers at Limerick were Type HFB breakers. On March 10, 2006, the vendor

issued TB-06-2, which stated that the lubricating properties of grease and oil used in the breakers would decrease over time. This could result in the breaker experiencing slower trip times or sticking in the "on" position during an over-current condition. TB-06-2 recommended maintenance practices and functional testing to address the aging issues and defined the design life of the breaker as 20 years. The inspectors further noted that NRC Information Notice 93-64, "Periodic Testing and Preventive Maintenance of Molded Case Circuit Breakers," also identified generic issues associated with aging of molded case circuit breakers.

Exelon entered this issue into the CAP as IR 948232. Exelon's corrective actions included: reclassifying all safety-related 480 volt MCUs as either "critical" or "non-critical," a formal review of TB-06-2 for applicability, and an extent-of-condition review of all direct current MCUs and 4 kilovolt circuit breakers. Also, preventive maintenance and testing was planned for all in-service 480 volt MCUs that had gone overdue because they were inappropriately classified as "run-to-failure."

Analysis: The performance deficiency associated with this issue is that Exelon inappropriately classified certain safety-related 480 volt molded-case circuit breakers as run-to-failure, which resulted in the breakers receiving no planned preventive maintenance or testing. This finding is more than minor because, if left uncorrected, the performance deficiency would lead to a more significant safety concern. Specifically, although no significant failures had been experienced to date at Limerick, the installed molded case circuit breakers had received no periodic planned maintenance or tests since 2004, and they were beyond the manufacturer's design life. Based on operating experience, this would result in a breaker being slow to trip or sticking in the "on" position after an over-current condition. Since the fault would be cleared by the upstream load center supply breaker, this would result in a loss of power to a safety-related electrical bus.

The inspectors assessed the finding using Phase 1 of IMC 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings" and determined the finding to be of very low safety significance (Green) because the issue was a qualification deficiency confirmed not to result in loss of operability per "Part 9900, Technical Guidance, Operability Determination Process for Operability and Functional Assessment." Since the change to the MCU preventive maintenance program was made in 2004, the inspectors determined that this finding was not reflective of current licensee performance and, therefore, did not have a cross-cutting aspect.

Enforcement: 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," requires, in part that a test program shall be established to assure that all testing required to demonstrate that components will perform satisfactorily in service is identified and performed in accordance with written test procedures. The test program shall include, as appropriate, operational tests during nuclear power plant operation. Contrary to Criterion XI, between 2004 and September 2009, Exelon failed to assure that a test program was established for all safety-related 480 volt MCU circuit breakers to assure that necessary testing, demonstrating that they would perform satisfactorily in service, was performed. Because this issue is of very low safety significance and has been entered into the CAP as IR 948232, this violation is being treated as an NCV, consistent with the NRC Enforcement Policy. (**NCV 05000352, 353/2009004-01, Failure to Adequately Test 480 Volt Motor Control Unit Circuit Breakers)**

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

a. Inspection Scope

The inspectors evaluated the effectiveness of Exelon's maintenance risk assessments required by 10 CFR 50.65(a)(4). This inspection included discussion with control room operators and risk analysis personnel regarding the use of Exelon's on-line risk monitoring software. The inspectors reviewed equipment tracking documentation, daily work schedules, and performed plant tours to gain assurance that the actual plant configuration matched the assessed configuration. Additionally, the inspectors verified that Exelon's risk management actions, for both planned and emergent work, were consistent with those described in Exelon procedure, ER-AA-600-1042, "On-Line Risk Management." The documents reviewed are listed in the Attachment. Inspectors reviewed the following samples:

- Unit 2 online risk with the 'C' emergency service water (ESW) pump, the 'C' residual heat removal (RHR) pump, and the D23 EDG OOS;
- Unit 1 online risk, with the 'A' ESW pump, the 'B' loop of core spray, and the 'A' reactor enclosure recirculation system fan OOS;
- Units 1 and 2 online risk color change to yellow for high risk evolution (turbine trip) caused by severe thunderstorm warning in vicinity; and
- Units 1 and 2 online risk during severe weather warning; and
- Unit 2 online risk with the HPCI system, 'B' core spray pump, 'B' RHR pump, and D22 EDG OOS due to failed fuse in initiation logic circuit.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15 - 6 samples)

a. Inspection Scope

The inspectors assessed the technical adequacy of a sample of six operability evaluations to ensure that Exelon properly justified TS operability and verified that the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors reviewed the UFSAR to verify that the system or component remained available to perform its intended safety function. In addition, the inspectors reviewed compensatory measures implemented to ensure that the measures worked and were adequately controlled. The inspectors also reviewed a sample of IRs to verify that Exelon identified and corrected deficiencies associated with operability evaluations. The documents reviewed are listed in the Attachment. The inspectors reviewed the following evaluations:

- IR 936117, EDG D21 cell exhaust fan (2A-V512) pitch control discovered to be wired incorrectly;
- IR 936883, EDG D21 high jacket cooling water temperature in stand-by;
- IR 943451, 'A' main control room chiller found at less than minimum emergency service water flow;
- IR 948232, No preventive maintenance performed on "run to failure" safety-related 480 volt motor control center molded case circuit breakers;

- IR 949148, Steam line temperature not reading as expected; and
- Operability evaluation OPE-09-004, HPCI pump room ventilation high differential temperature with room coolers secured.

b. Findings

No findings of significance were identified.

1R18 Plant Modifications (71111.18 - 2 samples)

.1 Temporary Modifications

a. Inspection Scope

The inspectors reviewed a temporary plant modification documented in Temporary Change Configuration Package 09-00438, "Potentially Non-conservative Steam Leak Detection Setpoint." The modification changed the nuclear steam supply shutoff system isolation actuation setpoint for the HPCI system room delta-temperature (difference between supply and exhaust temperatures). This was necessary following the discovery that the existing setpoint was non-conservative. The inspectors compared the modifications with the UFSAR and TS to verify that the modification did not adversely affect system operability, availability, or adversely affect plant operations. The inspectors ensured that station personnel implemented the modification in accordance with the applicable temporary configuration change process. The impact on existing procedures was reviewed to verify Exelon made appropriate revisions to reflect the temporary changes. The documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

.2 Permanent Modifications

a. Inspection Scope

The inspectors reviewed a permanent plant modification documented in Engineering Change LG 09-00369, "Fire Protection WP-124 Piping Flooding Analysis." The modification reduced the flow capability of the fire protection system associated with 4-kilovolt Room Corridor, Room 437, Elevation 239, Fire Area 7. The flow reduction was necessary following the discovery, as a result of a probabilistic risk assessment study, that a fire protection pipe break outside of the design basis (i.e., doubled-ended shear) could potentially result in the loss of several systems important to safety. The inspectors verified that the modification met the design basis and design assumptions, and that the modification preparation, staging, and implementation did not impair the capability of the fire protection system to combat a fire. The inspectors also reviewed the modification to verify that the post-modification testing would establish operability, that unintended system interactions would not occur, and that the testing demonstrated that the modification acceptance criteria were met. The documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing (71111.19 - 6 samples)

a. Inspection Scope

The inspectors reviewed six post-maintenance tests to verify that procedures and test activities ensured system operability and functional capability. The inspectors reviewed Exelon's test procedures to verify that the procedures adequately tested the safety functions that may have been affected by the maintenance activity, and that the acceptance criteria in the procedures were consistent with information in the licensing and design basis documents. The inspectors also witnessed the test or reviewed test data to verify that the results adequately demonstrated restoration of the affected safety functions. The documents reviewed are listed in the Attachment. The inspectors reviewed the following samples:

- CO228787, EDG D23 voltage regulator rectifier replacement;
- C0229844, Replace reactor protection system low level 3 relay (C71A-K6C);
- R1053686, SGTS exhaust damper PMT;
- C0230057, Repair valve operator for Unit 2 scram discharge volume drain valve (XV-047-2F011);
- C023-106, Replace Unit 2 Division II analog level trip unit LS-042-2N69B; and
- R1120408, EDG D21 exhaust fan 2A-V512 blade pitch positioner periodic maintenance.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22 - 6 samples. 5 routine surveillances, 1 IST)

a. Inspection Scope

The inspectors either witnessed the performance of, or reviewed test data for six surveillance tests (STs) associated with risk-significant SSCs. The reviews verified that Exelon personnel followed TS requirements and that acceptance criteria were appropriate. The inspectors also verified that the station established proper test conditions, as specified in the procedures, that no equipment preconditioning activities occurred, and that acceptance criteria were met. The documents reviewed are listed in the Attachment. The inspectors reviewed the following samples:

- ST-6-092-112-1, EDG D12 24-hour Endurance Test;
- ST-2-042-651-2, Reactor Protection System and Nuclear Steam Supply Shutoff System Reactor Vessel Water Level – Low Level 3; Division IIA, Channel C Functional Test (LIS-42-2N68OC);
- ST-6-076-250-1, Standby Gas Treatment System and Reactor Enclosure Recirculation System Flow Test;
- ST-6-051-233-1 'C' RHR Pump, Valve and Flow Test; (IST)
- ST-6-055-200-2, HPCI Valve Test; and
- ST-4-076-101,-0, 'A' Standby Gas Treatment System Heater Differential Pressure.

b. Findings

No findings of significance were identified.

EP6 Drill Evaluation (71114.06 - 2 Samples)

a. Inspection Scope

The inspectors observed the two emergency preparedness drills listed below to assess Exelon's emergency response organization's (ERO's) implementation of the Limerick emergency plan and implementing procedures. The inspectors reviewed the ERO's response to simulated degraded plant conditions to identify weaknesses and deficiencies in classification, notification, and PAR development activities. In addition, the inspectors assessed licensed operator performance required to ensure the safe operation of the reactor and the protection of the nuclear fuel and primary containment barriers. The inspectors observed Exelon's critiques of the drill to evaluate their ability to identify weaknesses and deficiencies at an appropriate threshold. The inspectors verified that the licensee appropriately assessed ERO performance with regard to activities contributing to the Drill and Exercise Performance PI training evolution and drills. The documents reviewed are listed in the Attachment. The inspectors assessed the following samples:

- Emergency Preparedness Drill conducted on June 21, 2009; and
- Emergency Preparedness Drill conducted on August 11, 2009.

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

Cornerstone:Occupational Radiation Safety

2OS1 Access Control to Radiologically Significant Areas (71121.01 - 1 sample)

a. Inspection Scope

During the period of August 3 - 7, 2009, the inspectors conducted the following activities to verify that the licensee was properly implementing physical, administrative, and engineering controls for access to locked high radiation areas and other radiologically controlled areas, and that workers were adhering to these controls when working in these areas. Implementation of these controls was reviewed against the criteria contained in 10 CFR Part 20, TS, and the licensee's procedures. The documents reviewed are listed in the Attachment. This inspection activity represents completion of two samples relative to this inspection area.

Problem Identification and Resolution

- The inspectors evaluated the actions taken in response to IR 947522, regarding sea van material conditions. The inspectors reviewed the access controls to the Radioactive Waste Storage Pad, including the routine radiation/material condition

inspections performed on containers stored there, and accompanied radiation technicians performing inspections of two sea vans (Nos. 5 & 32). The inspectors attended the pre-job brief, reviewed the associated procedure entitled "Requirements for Radioactive Materials Stored Outdoors" (RP-AA-500-1001), performed a light-leakage test on the associated sea vans, and examined the corrective actions taken to improve sea van material condition;

b. Findings

No findings of significance were identified.

2OS3 Radiation Monitoring Instrumentation and Protective Equipment (71121.03 - 9 samples)

a. Inspection Scope

During the period August 3 - 7, 2009, the inspectors conducted the following activities to evaluate the operability and accuracy of radiation monitoring instrumentation, and the adequacy of the respiratory protection program for issuing self-contained breathing apparatus (SCBA) to emergency response personnel. Implementation of these programs was reviewed against the criteria contained in 10 CFR 20, applicable industry standards, and the licensee's procedures. The documents reviewed are listed in the Attachment. The inspectors reviewed:

- The inspectors traveled to the licensee's calibration facility (PowerLabs) in Coatesville, PA, to observe instrument calibrations. The inspectors reviewed the relevant procedures and observed a technician perform calibration of a portable survey instrument, RO-2A ion chamber, and perform calibration checks on 24 electronic dosimeters. The inspectors also reviewed the licensee's process for receiving instruments and distributing those instruments to various facilities;
- Calibration records for selected area monitors, survey instruments and contamination monitors, currently in use on site, including small article contamination monitors (SAM-9/11), personnel contamination monitors (PM-7 and PCM-1B), hand-held survey instruments (E-140N, E-520, RO-2A, ASP-1, Telepole), and an air sampler (AMS-4). The inspectors also observed daily source checks performed on seven PCM-1B monitors, located at the main control points;
- Licensee's actions taken when portable survey instruments were found to be outside the "as found" calibration acceptance criteria during recalibration checks. As part of this evaluation, the inspectors reviewed Out-of-Tolerance reports, initiated from January 2008 to July 2009, for selected instrumentation;
- Operating procedure and current source activities/dose rate characterizations for the Shepherd Model 89 calibrator located at the PowerLabs facility;
- Current 10 CFR 61 sampling results for Units 1 and 2 and the resulting determination of the plant's average beta and average gamma energies to determine if the calibration sources used are representative of the plant source term;
- Current calibration records for the Fast-Scan and Accu-Scan whole body counting systems;
- Calibration data and maintenance histories for area radiation monitors (ARMs), not covered by the Maintenance Rule, including ARMs located in the Units 1 and 2 drywells, spent fuel pool areas, the traversing incore probe areas, and radwaste processing areas. The operational status of these instruments was discussed with the System Manager and the Instrumentation and Control Supervisor;

- Evaluated the adequacy of the respiratory protection program regarding the maintenance and issuance of SCBA to emergency response personnel. Training and qualification records were reviewed for at least three licensed operators from each of the operating shifts, and for selected radiation protection personnel who would wear SCBAs in the event of an emergency. The inspectors observed a technician perform functional inspections on three SCBAs staged in the Control Room, two SCBAs staged on the Unit 2 turbine deck, and one stored at the Health Physics main control point. The inspectors also observed the performance of a fit test. Maintenance, hydrostatic test records, and flow test records for these selected SCBAs, were reviewed. The method of refilling SCBA cylinders was evaluated and the compressor air sample results were reviewed to confirm that the air quality met CGA G-7.1, Grade E (2004) standards; and
- Issue Reports, Out-Of-Tolerance reports, Radiation Protection Department focused area self-assessments, Nuclear Oversight Department (NOD) Audits, and NOD Objective Evidence reports to evaluate the licensee's threshold for identifying, evaluating, and resolving problems in implementing the radiation monitoring and respiratory protection programs. This review was conducted against the criteria contained in 10 CFR 20, Technical Specifications, and the licensee's procedures.

b. Findings

No findings of significance were identified.

2PS1 Radioactive Gaseous and Liquid Effluent Treatment and Monitoring Systems (71122.01 - 3 samples)

a. Inspection Scope

During the period of August 17 - 21, 2009, the inspectors conducted the following activities to verify the licensee was properly maintaining the gaseous and liquid effluent processing systems to ensure that radiological releases were properly mitigated, monitored, and evaluated with respect to public exposure. Implementation of these controls was reviewed against the criteria contained in 10 CFR Parts 20 and 50, the licensee's Offsite Dose Calculation Manual (ODCM), and the licensee's procedures. The documents reviewed are listed in the Attachment. This inspection activity represents completion of three samples relative to this inspection area. The inspectors reviewed:

- 2008 Annual Radiological Effluent Release Report (No. 34) to verify that the effluents program was implemented as required by the ODCM;
- Examined portions of the Unit 1 and Unit 2 gaseous and liquid release monitoring systems, with a chemistry technician, to evaluate equipment material condition. The inspectors reviewed the most current System Health reports for the process radiation monitoring systems and discussed the system status with the cognizant system engineer. The inspectors also reviewed the completed ST procedures associated with each monitor that demonstrated instrument functionality.
- Observed a technician collecting weekly air particulate filter and iodine cartridge samples and reviewed the relevant ST (ST-5-076-815) and associated sampling procedure (CY-LG-170-202-9). Airborne samples were taken from the North Stack monitors, the South Stack monitors, and the Wide Range Gas monitor;

- Air cleaning system surveillance test results for the HEPA and charcoal filtration systems installed in Unit 1 and Unit 2. Systems reviewed included the A & B SGTS, A & B CREAS, and the A & B Reactor Enclosure Re-circulation Systems. The inspectors confirmed that the air flow rates were consistent with the FSAR values;
- Current liquid and gaseous effluent monitor functional test results and calibration records to verify that the associated isolation functions and alarms were operable. The inspectors evaluated the effluent radiation monitor setpoints for agreement with the ODCM requirements;
- Evaluated the preparation of a liquid effluent discharge permit (No. 09-0091) for releasing a Floor Drain Sample Tank by observing a chemistry technician obtaining a liquid sample and discussing the associated procedures with the radwaste technician. Procedures discussed included the "RadWaste Discharge Permit" (ST-5-061-570-0), "Radwaste Discharges" (CY-LG-170-101), and "Obtaining Samples from the Radwaste Enclosure Sample Station" (CY-LG-120-113);
- Administrative changes made to the ODCM in 2008 to determine if the changes affected the licensee's ability to maintain doses as low as is reasonably achievable;
- Liquid and gaseous effluent monthly, quarterly, and annual dose calculations for calendar year 2008 through July 2009 to ensure that the licensee properly calculated the offsite dose from effluent releases, in accordance with the ODCM, and to determine if any performance indicator (criteria contained in Appendix I of 10 CFR 50) was exceeded;
- Calibration records and quality control records for laboratory counting instrumentation (Gamma Detectors Nos. 1, 2, 3, and 4, and a liquid scintillation detector) used to characterize and quantify effluent samples;
- Results of the licensee's inter-laboratory (cross check) comparison program to verify the accuracy of effluent sample analyses performed by the licensee;
- Discussed with the licensee the validation and verification results for the effluent software (OpenEMS) to ensure the software in use provides accurate dose calculations; and
- Relevant IRs, an Effluents Control Program self-assessment (LS-AA-126-1001), and an effluents program audit (NOSA-LIM-08-04) to evaluate the licensee's effectiveness in identifying, evaluating, and resolving effluent control issues. This review was conducted against the criteria contained in 10 CFR 20, Technical Specifications, and the licensee's procedures.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verification (71151 - 8 samples)

.1 Initiating Event and Mitigating Systems Cornerstone PIs

a. Inspection Scope

The inspectors sampled Exelon's submittal of the Initiating Events cornerstone and Mitigating Systems cornerstone PIs listed below to verify the accuracy of the data recorded from July 2008 though June 2009. The inspectors utilized performance indicator definitions and guidance contained in Nuclear Energy Institute (NEI) 99-02,

"Regulatory Assessment Performance Indicator Guidelines," Revision 5, to verify the basis in reporting for each data element. The inspectors reviewed various documents, including portions of the main control room logs, issue reports, power history curves, work orders, and system derivation reports. The inspectors also discussed the method for compiling and reporting performance indicators with cognizant engineering personnel and compared graphical representations from the most recent PI report to the raw data to verify that the report correctly reflected the data. The documents reviewed are listed in the Attachment.

Cornerstone: Initiating Events (4 samples)

- Units 1 and 2 Unplanned Scrams per 7000 Critical Hours (IE01)
- Units 1 and 2 Unplanned Scrams with Complications (IE04)

Cornerstone: Mitigating Systems (2 samples)

- Units 1 and 2 Mitigating Systems Performance Index, Residual Heat Removal (MS09)

b. Findings

No findings of significance were identified.

.2 Occupational Exposure Control Effectiveness PI (OR01)

a. Inspection Scope (1 Sample)

The inspector reviewed implementation of the licensee's Occupational Exposure Control Effectiveness Performance Indicator (PI) Program. Specifically, the inspector reviewed issue reports, and associated documents, for occurrences involving locked high radiation areas, very high radiation areas, and unplanned exposures against the criteria specified in NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," to verify that all occurrences that met the NEI criteria were identified and reported as performance indicators. This inspection activity represents the completion of one (1) sample relative to this inspection area; completing the annual inspection requirement.

b. Findings

No findings of significance were identified.

.3 RETS/ODCM Radiological Effluent Occurrences PI (PR01)

a. Inspection Scope (1 Sample)

The inspector reviewed relevant effluent release reports for the period August 1, 2008 through July 31, 2009, for issues related to the public radiation safety performance indicator, which measures radiological effluent release occurrences that exceed 1.5 mrem/qtr whole body or 5.0 mrem/qtr organ dose for liquid effluents; 5mrads/qtr gamma air dose, 10 mrad/qtr beta air dose, and 7.5 mrads/qtr for organ dose for gaseous effluents. This inspection activity represents the completion of one (1) sample relative to this inspection area; completing the annual inspection requirement.

The inspector reviewed the following documents to ensure the licensee met all requirements of the performance indicator from the third quarter 2008 to the third quarter 2009: monthly projected dose assessment results due to radioactive liquid and gaseous effluent releases; quarterly projected dose assessment results due to radioactive liquid and gaseous effluent releases; and dose assessment procedures.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems (71152 - 2 Samples)

.1 Review of Items Entered into the Corrective Action Program (CAP)

As required by Inspection Procedure 71152, "Identification and Resolution of Problems," and in order to help identify repetitive equipment failures or specific human performance issues for follow-up, the inspectors screened all items entered into Limerick's corrective action program. The inspectors accomplished this by reviewing each new condition report, attending management review committee meetings, and accessing Exelon's computerized database.

.2 Annual Sample: Review of Root Cause Analysis for Motor Control Center (MCC) D224-R-G-08 Bucket Failure

a. Inspection Scope

The inspectors reviewed IR 874599 which documented a root cause analysis for an electrical fault which resulted in the loss of 480 volt MCC D224-R-G-08. The fault resulted in the loss of multiple safety-related components including two battery chargers and four drywell unit coolers. The inspectors reviewed the root cause evaluation including the event description, failure analysis, extent of condition and cause, and corrective actions to determine the completeness of the evaluation and the adequacy of the corrective actions. The inspectors interviewed engineers and maintenance personnel to evaluate the effectiveness of the corrective actions.

b. Findings and Observations

Introduction. The inspectors identified a Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," for not correcting a condition adverse to quality associated with the performance of thermography on safety-related breakers. Specifically, although Exelon identified that the failure to perform thermography on breakers in a loaded condition was a causal factor for an electrical fault that occurred in January 2009, Exelon did not implement proper corrective actions to ensure that applicable future thermography examinations would be conducted while the breakers were in a loaded condition.

Description. On January 31, 2009, an electrical fault occurred in a drywell cooling fan breaker in a 480 volt MCC. This fault resulted in the loss of multiple safety-related loads. Exelon determined that the root cause of the electrical fault was incorrectly terminated power leads into a breaker. The leads were at an angle rather than straight into the terminals, which resulted in a high resistance connection in the breaker. Exelon also

determined that the failed connection had been routinely scheduled for thermography examinations; however the testing had not been performed in several years.

Exelon's investigation identified that most safety-related 480 volt breakers at Limerick were scheduled for thermography examinations on a yearly basis. However, if the load for the breaker was not energized when the technician arrived to perform the test, the thermography was not performed since it would not provide useful data. For the breaker that faulted, a thermography test had not been performed since October 3, 2005. The root cause report recognized that "thermography is the best tool to find high resistance/ hot connections," and if thermography had been routinely performed when the breaker was loaded, the high resistance connection would likely have been identified prior to its failure. Therefore, Exelon concluded that not requiring connections to be loaded during thermography was a causal factor in the electrical fault.

The inspectors reviewed work orders, procedures, and condition reports to determine the effectiveness of Exelon's corrective actions for this issue. Exelon's corrective actions included performing walkdowns of safety-related MCCs to inspect the alignment of cables entering the breakers, modifying maintenance procedures to ensure future breaker maintenance would provide better cable alignment and detection of high resistance connections, and performing a one-time thermography of all safety-related breakers in a loaded condition. Additionally, Exelon established a corrective action to revise the work orders for all 16 drywell cooling fans to ensure future thermography examinations were performed while the breakers were in a loaded condition.

During the MCC walkdowns, Exelon observed that "approximately 75 percent of all the cables enter the top of the molded case breaker on an angle" (IR 924627), which made them susceptible to high resistance. Additionally, the one-time thermography results revealed several high resistance connections that Exelon promptly addressed. These observations reinforced Exelon's conclusion, discussed in the root cause report, that the high resistance connection found in the faulted MCC compartment "could exist in virtually any 480 volt AC MCC compartment." Based on this remark, the inspectors questioned why the corrective action to ensure loaded conditions for future thermography examinations was implemented for the drywell cooling fans only. Since many 480 volt MCC compartments were susceptible to a high resistance connection, the inspectors determined that all 480 volt safety-related breakers should receive thermography examinations or be otherwise analyzed. The inspectors reviewed and agreed with Exelon's documented basis for not performing thermography on breakers associated with motor operated valves. However, the inspectors concluded that Exelon did not have valid justification for not performing loaded thermography on the remaining 480 volt safety-related breakers. In response to this issue, Exelon added 48 breakers to the list of breakers which will be loaded prior to thermography, and also created assignment 58 to IR 874599 to formally assess the remaining breakers, which may not be energized during routine thermography rounds and therefore would not receive thermography.

Analysis: The inspectors determined that the failure to correct a condition adverse to quality associated with the performance of thermography on safety-related 480 volt breakers was a performance deficiency. The finding was more than minor because it was associated with the equipment performance attribute of the Mitigating Systems cornerstone and affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Additionally, the inspectors determined that this issue could become a

more significant safety concern if left uncorrected, because Exelon's root cause had identified that 75 percent of the safety-related MCC breakers at Limerick had incorrectly aligned breaker leads and therefore could be susceptible to high resistance.

In accordance with NRC Inspection Manual Chapter 0609, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings," a Phase 1 SDP screening was performed and determined the finding was of very low safety significance (Green) because it was not a design or qualification deficiency, did not represent a loss of system safety function, and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. This finding has a cross-cutting aspect in the area of Problem Identification and Resolution, Corrective Action Program, because Exelon did not take appropriate corrective actions to address a safety issue. Specifically, although the failure to perform thermography on breakers in loaded conditions was identified as a causal factor for an electrical fault, actions were not taken in a timely manner to ensure loaded conditions for applicable future thermography examinations. [P.1(d)]

Enforcement. 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," requires, in part, that measures be established to assure that conditions adverse to quality are promptly identified and corrected. Contrary to the above, between March 19, 2009 and July 10, 2009, Exelon did not correct a condition adverse to quality associated with the performance of thermography on safety-related 480 volt breakers. Specifically, although the failure to perform thermography on breakers in loaded conditions was identified as a causal factor for an electrical fault, actions were not taken to ensure loaded conditions for applicable future thermography examinations. Because the finding is of very low safety significance and has been entered into Exelon's corrective action program (IR 874599 Assignment 58), this violation is being treated as a non-cited violation, consistent with the NRC Enforcement Policy. **(NCV 05000352, 353/2009004-02, Failure to Correct 480V Breaker Thermography)**

.3 Annual Sample: Review of Emergency Diesel Generator Volt-Ampere Reactive (VAR) Oscillations

a. Inspection Scope

The inspectors reviewed IR 772343 which documented VAR swings for the D12 EDG on May 6, 2008. IR 772343 included a technical evaluation for previous VAR swings which had occurred intermittently between 2004 and 2008. The inspectors reviewed the technical evaluation including the historical review, plant data review, conclusions and corrective actions to determine the completeness of the evaluation and the adequacy of the corrective actions. The inspectors interviewed the system engineer to understand the effectiveness of the corrective actions and related testing since the 2008 event.

b. Findings and Observations

No findings of significance were identified.

The inspectors determined that the evaluation of the issue in IR 772343 performed an adequate review of the May 6, 2008, event in the context of the historical VAR swings for the D12 EDG. The inspectors determined that the technical evaluation provided a reasonable basis that the VAR swings, since 2006, have been caused by transformer automatic tap changer induced voltage changes. By placing the tap changers in manual

the VAR swings have not re-occurred, which provides further confidence that the cause was correctly identified. The inspectors determined that Exelon properly implemented their corrective action process regarding the identification, evaluation, corrective actions for the EDG VAR swings.

4OA3 Event Follow-up (71153 - 5 samples)

.1 Plant Event Review

a. Inspection Scope

For the three plant events listed below, the inspectors reviewed and/or observed plant parameters, reviewed personnel performance, and evaluated performance of mitigating systems. The inspectors communicated the plant events to appropriate regional personnel and compared the event details with criteria contained in IMC 0309, "Reactive Inspection Decision Basis for Reactors," for consideration of potential reactive inspection activities. The inspectors reviewed Exelon's follow-up actions related to the events to assure that appropriate corrective actions were implemented commensurate with their safety significance.

- IR 953620, Unit 1 bypass valve opened unexpectedly;
- IR 958587, Discovery of non-conservative HPCI room steam leak detection setpoint; and,
- IR 960355, Loss of power to Unit 2, Division II, engineered safety features logic.

b. Findings
No findings of significance were identified.

.2 (Closed) Licensee Event Report (LER) 05000353/2009-002-00: Inoperable Main Turbine Bypass System.

On May 8, 2009, Exelon identified that prior troubleshooting activities performed on the Unit 2 main turbine bypass system rendered the system inoperable and the actions required by TS Limiting Condition for Operation (LCO) 3.7.8, "Main Turbine Bypass System," were not implemented. On February 15, 2008, the Unit 2 bypass valves momentarily opened during main turbine stop valve stroke testing. Troubleshooting activities required electrical connections to be lifted in the associated electro-hydraulic system load limit circuitry. At the time, Exelon believed that this action had no effect on main turbine bypass system operability because the pressure control function of the system remained functional. However, upon further investigation following a similar event occurring in April 2009, Exelon discovered that disabling the load limit circuit output could effect main turbine bypass valve response time and, therefore, system operability. The issue was entered into Exelon's CAP as IR 917231. Exelon identified three additional similar activities that were conducted on Unit 2. Corrective actions included revising Design Basis Document LS-S-45, "Main Steam, Turbine, and Extraction Steam System," to include the design basis function of the stop valve load limit logic and its impact on the main turbine bypass system response time. The enforcement aspects of the violation are discussed in Section 4OA7. No new issues were identified during the review of the LER. This LER is closed.

.3 (Closed) LER 05000352,353/2009002: "A" Control Room Emergency Fresh Air Supply Subsystem Inoperable.

On December 9, 2008, Exelon received laboratory results for an "A" CREFAS charcoal sample that had been taken on November 21, 2008. The laboratory results indicated that the methyl iodide penetration for the charcoal sample exceeded the limit of 2.5 percent that was specified in Limerick TS. Limerick declared "A" CREFAS subsystem inoperable and entered TS 3.7.2, which allowed up to seven days to restore the subsystem to operable. Limerick replaced the affected charcoal bed and declared "A" CREFAS operable on December 11, 2008. Because the charcoal sample was taken on November 21, 2008, and the charcoal bed was not replaced until December 11, 2008, the licensee determined that the "A" CREFAS subsystem had been inoperable for a period that exceeded the TS allowed outage time of seven days and was reportable as a condition prohibited by TSs. Limerick submitted LER 2009-002-00 to document this condition. The issue was entered into Exelon's CAP as IRs 853914 and 891017.

The inspectors reviewed LER 2009-002-00 and determined that there was no performance deficiency associated with this issue. Specifically, the Limerick TS allowed up to 30 days to receive the results of the charcoal sample, and Limerick received their results within 18 days. Additionally, Limerick entered TS 3.7.2 upon receiving the failed analysis results and replaced the affected charcoal within the seven day allowed outage time. Therefore, this LER is closed.

4OA5 Other Activities

.1 Quarterly Resident Inspector Observations of Security Personnel and Activities

a. Inspection Scope

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

These quarterly resident inspector observations of security force personnel and activities did not constitute any additional inspection samples. Rather, they were considered an integral part of the inspectors' normal plant status review and inspection activities.

b. Findings

No findings of significance were identified.

.2 Emergency Preparedness Component of the Force-on-Force Exercise Evaluation (IP 71114.07 – 1 Sample)

a. Inspection Scope

The inspectors observed Exelon's performance during the site emergency preparedness component of the FOF exercise in the Technical Support Center. The inspectors observed communications between operations and security supervision, including the flow of information for decision-making. The inspectors observed event classification, event notification activities by the participating shift manager (Emergency Director), and the other operations staff participating in the exercise. The inspectors reviewed the emergency preparedness-related corrective actions from a previous inspection

conducted by the NRC's Office of Nuclear Security and Incident Response to determine whether they had been completed and adequately addressed the cause of the previously-identified weakness. The inspectors also observed the post-exercise critique to determine whether their observations were also identified by Exelon's evaluators or participants. The inspectors verified that minor issues identified during this inspection were entered into the licensee's corrective action program.

This inspection constitutes one sample as defined by Inspection Procedure 71114.07.

b. Findings

No findings of significance were identified.

.3 Independent Spent Fuel Storage Installation (ISFSI) (60855 - 1 Sample)

a. Inspection Scope

An ISFSI inspection was conducted on August 19, 2009, under the Nuclear Material Safety and Safeguards inspection program using Inspection Procedure 60855, the inspector reviewed the ongoing maintenance and surveillance activities for the on-site storage of spent fuel and toured the ISFSI with a plant equipment operator and a radiation protection technician. The ISFSI licensing basis documents and implementing procedures were reviewed as the standards for the inspection. The inspection consisted of observing the condition of the ISFSI system; performing independent radiation surveys of the storage modules; and review of the surveillance records, including air vent inspections, radiation surveys/dosimeter results, and recent daily air vent outlet temperature readings.

b. Findings

No findings of significance were identified.

4OA6 Meetings, Including Exit

Exit Meeting Summary

On October 16, 2009, the resident inspectors presented the inspection results to Mr. C. Mudrick and other members of his staff. The inspectors confirmed that proprietary information was not included in the inspection report.

4OA7 Licensee-Identified Violations

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

- TS LCO 3.7.8, "Main Turbine Bypass System," requires the main turbine bypass system to be operable when in Operational Condition 1, when thermal power is greater than or equal to 25 percent of rated thermal power. With the main turbine bypass system inoperable, TS 3.7.8 requires restoration of the system to an operable status within 1 hour or take the action required by TS 3.2.3.c. TS 3.2.3.c requires that Minimum Critical Power Ratio (MCPR) be determined to be greater

than or equal to the rated MCPR limit specified in the Core Operating Limits Report Main Turbine Bypass Valve Inoperable Curve. Contrary to TS 3.7.8, Unit 2 operated in Operational Condition 1 with thermal power greater than 25 percent with the main turbine bypass system inoperable for greater than 1 hour and the action required by TS 3.2.3.c was not performed. Specifically, during troubleshooting and surveillance test activities on February 15, 2008, May 24, 2008, September 13, 2008, and December 14, 2008, the main turbine bypass system was rendered inoperable for greater than one hour and the MCPR was not determined to be greater than or equal to the rated MCPR limit specified in the Core Operating Limits Report. The issue was entered into Exelon's CAP as IR 917231. The finding was determined to have very low safety significance (Green) using NRC IMC 0609, Attachment 4, Phase 1 – Initial Screening and Characterization of Findings, Fuel Barrier, because operation with MCPR less than the rated MCPR limit specified in the Core Operating Limits Report could potentially only affect the fuel barrier and the condition did not represent a loss of the pressure mitigating function of the main turbine bypass system or affect the spent fuel pool.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Exelon Generation Company
C. Mudrick, Site Vice President
E. Callan, Plant Manager
M. Lyate, Manager, Radiation Protection
R. Dickinson, Director, Engineering
P. Gardner, Director, Operations
R. Kreider, Director, Maintenance
J. Hunter, Manager, Regulatory Assurance
D. Palena, Manager, Nuclear Oversight
S. Bobyock, Manager, Plant Engineering
F. Michaels, Manager, Electrical Engineering Systems
E. Dennin, Shift Operations Superintendent
C. Gray, Manager, Radiological Engineering
R. Harding, Engineer, Regulatory Assurance
J. Berg, System Manager, HPCI
A, Jain, System Manager, Radiation Monitoring Systems
L. Lail, System Manager, EDGs
R. Gosby, Radiation Protection Technician, Instrumentation
J. Sprucinski, Senior Radiation Protection Technician
R. Harding, Regulatory Assurance
D. Wahl, Environmental Scientist
C. Rich, Manager of Nuclear Training
D. Monahan, Simulator Operator/Instructor
R. Harding, Licensing
R. George, Manager, Electrical Design
C. Pragman, Exelon, Corporate Fire Protection Engineer
P. Tarpinian, Probability Risk Assessment
K. Ferich, Limerick Emergency Planning Manager
M. Crim, Emergency Prepardness Coordinator
R. Rogers, Exelon Facility and Equipment Coordinator
E. Bell, Senior Radiation Protection Technician
D. Kern, Senior radiation Protection Technician
T. Moore, Director, Work Management
J. Risteter, Radiation Protection Supervisor, Technical Support

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

05000353/2009-002-00	LER	Inoperable Main Turbine Bypass System (Section 4OA3.2)
05000352,353/2009002	LER	"A" Control Room Emergency Fresh Air Supply Subsystem Inoperable (Section 4OA3.3)

Opened and Closed

05000352, 353/2009004-01	NCV	Failure to Adequately Test 480 Volt Motor Control Unit Circuit Breakers (Section 1R12)
05000352, 353/2009004-02	NCV	Failure to Correct 480V Breaker Thermography (Section 4OA2.2)

Discussed

None

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

Procedures
SE-9, Preparation for Severe Weather, Revision 27
OP-AA-106-101-1001, Event Response Guidelines, Revision 15
OP-AA-108-111-1001, Severe Weather and Natural Disaster Guidelines, Revision 3
S35.0.O, Response to Loss of the 363 or 342 Moser Lines, Revision 0

Issue Reports
IR 954897, 363 line deenergized by storm

Section 1R04: Equipment Alignment

Procedures
2S92.1.N, Equipment Alignment for 2A Diesel Generator Operation
1552.1.A (COL-2), Equipment Alignment for Core Spray Loop 'B' Operation, Revision 11
1S76.1.C (COL), Equipment Alignment of Standby Gas Treatment System Reactor Enclosure Air Recirculation System for Automatic Initiation, Revision 12

Issue Reports
IR 874070, Filter max temp may be exceeded when operating

Section 1R05: Fire Protection

Procedures
F-A-432, Unit 1 D14 Emerg 4KV Switchgear Room 432 (Elevation 239) Fire Area 14, Revision 8
F-A-435, Unit 1 D11 Emerg 4KV Switchgear Room 435 (Elevation 239) Fire Area 13, Revision 9
F-R-179, Unit 2 RCIC Pump Room 179 (Elevation 177), Fire Area 56, Revision 5
F-R-180, Unit 2 HPCI Pump Room 180 (Elevation 177), Fire Area 57, Revision 5
F-D-315A, D21 Diesel Generator and Fuel Oil/Lube Oil Tank Room (Elevation 217), Fire Area 83, Revision 5

Section 1R06: Flood Protection Measures

Issue Reports
IR 847842, Evaluate Impact of Water in Plan Manholes and Vaults

Section 1R11: Licensed Operator Requalification Program

Issue Reports
IR 946384, Emergency Preparedness Shortfalls in Licensed Operator Requalification Training
End of cycle 0903 Report

Miscellaneous
LS-AA-120, Issue Identification and Screening Process, Revision 9

Section 1R12: Maintenance Effectiveness

Issue Reports
IR 866263, D24 local tachometer oscillations
IR 966775, Need to create AR to bench test signal generator and speed switch
IR 853914, 'A' CREFAS filter failed charcoal analysis
IR 698223, 'B' CREFAS trouble alarm locked in
IR 885308, Past PMT deficient for HV-078-057B-OP

Work Orders
M1713321, Perform component testing on speed signal loop

Other Documents
NUREG 1.52, "Design, testing, and maintenance criteria for post accident engineered-safety-feature atmosphere cleanup system air filtration and adsorption units of light-water-cooled nuclear power plants," Revision 2

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Procedures
WC-AA-101, On-line Work Control Process, Revision 15

Section 1R15: Operability Evaluations

Issue Reports
A-1717164 Technical Evaluation to determine impact of 2A-U512 fan at minimum position
Calculations for EDG building HVAC system, M-81-14, Revision 5
UFSAR 9.U.6, Diesel Generator Enclosure Ventilation System

Miscellaneous

Section 1R18: Plant Modifications

Procedures
UFSAR; Appendix 9A, Fire Protection Analysis Report
NFPA 13, Standard for the Installation of Sprinkler Systems, 2007 Edition
ECR 99-00485, Addition of a Wet Pipe Sprinkler System for Fire Area 7
Calculation Wp-124 Hydraulic Analysis
CC-MA-112-1001, Temporary Configuration Change Packages (TCCP), Revision 3
CC-AA-12, Temporary Configuration Changes, Revision 14.

Section 1R19: Post-Maintenance Testing

Procedures
ST-6-076-250-1, SGTS and RERS Flow Test, Revision 45
ST-6-107-201-0, IST Valve Stroke for new Baseline, Revision 5
ST-2-042-934-2, RPS and NSSS – Reactor Vessel Water Level-Low, Level 3; Division IIA, Channel C, Response Time Test (LIS-42-2N680C)
M-600-005, PM for Model NH91 and NH95 ITT Actuators
MA-AA-716-012, Post Maintenance Testing
MA-AA-716-100, Conduct of Maintenance Manual, Revision 11

CR/IR
IR 955664, Unexpected SGTS response during ST-4-076-101-0

Work Order
R1053686

Section 1R22: Surveillance Testing

Procedures
ST-6-076-250-1, SGTS and RERS Flow Test, Revision 45
ST-2-042-651-2, Temporary Change Control Form 09-0366-2
ST-6-055-200-2, HPCI Valve Test, Revision 49
ST-6-051-233-1, C RHR Pump, Valve, and Flow Test, Revision 64

Issue Reports
IR 940294, Air Leak from EDG D12 Inspection Port
IR 940446, EDG D12 Fuel Oil Return Line Leaking
IR 966706, HS-055-206 does not spring return to normal
IR 955071, 0B-E188 has no on/off indication

Work Order
R1139635

Other
Limerick Tech Spec 4.6.5.3.a
Limerick Tech Spec 4.6.5.4.a
Limerick UFSAR Section 6.5.1.1, "Standby Gas Treatment System"
Drawing M-1-E-41-1040-E-027, Elementary Diagram HPCI System, Sheet 3, Revision 0

Secton EP6: Drill Evaluation

Issue Reports
IR 945631, One Failed Demonstration Criteria in OSC during July 21, 2009 drill
IR 945616, One Failed Demonstration Criteria in TSC during July 21, 2009 drill

Miscellaneous
NEI 99-02, Regulatory Assessment Performance Indicator Guideline, Revision 5

Section 20S1: Access Control to Radiologically Significant Aares
Section 20S3: Radiation Monitoring Instrumentation and Protective Equipment

Procedures:
RP-LG-462-1000, Revision 0, Limerick Process and Area Radiation Monitor List
RP-AA-210, Revision 11, Dosimetry Issue, Usage, and Control
RP-AA-503, Revision 2, Unconditional Release Survey Method
RP-AA-700, Revision 2, Controls for Radiation Protection Instrumentation
RP-LG-700-1001, Revision 3, Radiation Protection Instrumentation Operations Guidelines
RP-LG-220-1001, Revision 5, Perform Calibration Checks and a Whole Body Count on the AccuScan
RP-LG-225, Revision1, Calibration of Canberra AccuScan and FastScan Whole Body Counters
RP-LG-719, Revision 1, Calibration of Eberline Model PM-7, Personnel Monitor
RP-LG-718, Revision 0, Dose Rate Verification of Shepherd Model 89 Gamma Calibrator
RP-LG-720, Revision 1, Calibration of NE Technology Model SAM-9 Small Articles Monitor
RP-LG-721, Revision 2, Calibration and Preventive Maintenance of Eberline Model PCM-1C, Personnel Contamination Monitor
RP-LG-725, Revision 0, Calibration of Eberline AMS-4
IC-C-12-00110, Revision 1, Calibration of Eberline Model RO-20 Ion Chambers
IC-C-12-0112, Revision 0, Calibration of Eberline Model E-520 Geiger Counter
IC-12-00439, Revision 1, Calibration of the RADECO Model H-809C Portable Air Sampler
IC-11-0376, Revision 5, Calibration of General Electric Area Radiation Monitors
RT-0-111-900-0, Revision 31, One Hour SCBA Cylinder Inspection and Functional Test
RP-AA-500-1001, Revision 2, Requirements for Radioactive Materials Stored Outdoors

LAB-120, Revision 2, Calibration of Radiation Protection Instrumentation
OJT#707, Revision 22, Out-Of-Tolerance and Inoperative Equipment
OJT# 184, Revision 2. Calibration of Ionization Chambers and Box Calibrators Using Gamma Radiation
RP-LG-441-1010, Revision 3, Issue and Control of Respiratory Protection Equipment

Technical Reports
RP-03-002, Justification for annual calibration of Siemens Mk-II Electronics Dosimeters Models EPD and EPDN
RP-08-08, 2007 Isomix Report

Issue Reports:
947522, 949781, 930429, 730548, 731327, 755495, 766186, 778394, 827186, 888502, 874185, 932120, 646391, 663329, 730548, 759267, 749232, 640611, 746469, 772141, 628348, 672590

Focused Area Self-Assessments /Objective Evidence Reports:
Radiation Monitoring Instrumentation and Protective Equipment, 835370
Audit of Hagemeyer SCBA Services, 835370
Nuclear Oversight Objective Evidence Report (NOSA-LIM-07-06)
Nuclear Oversight Objective Evidence Report (NOSA-LIM-09-06)
Nuclear Oversight Objective Evidence Report (NOSA-LIM-09-04)

Calibration Records Reviewed:
Area Radiation Monitors:RE-14, RE-17, RE-29, RE-30, RE-31, RE-32, RE-33, RE-35, RE-41, RE-42, RE-43
PCM-1B Nos.: 33-2370, 33-2369, 33-2165, 33-2333, 33-2321, 33-2117,M 33-2124
SAM-11: Nos. 335001, 335000, 332533, 334219, 334829
RO-2A: 330282, 076736, 332019, 330369, 0010534
RO-20: No. 077721
E-140N No. 330599
ASP-1: Nos .334891, 334856
Telepole No. 077624, 6605-056
Bicron Micro-Rem: No. 33918
E-520: No. 333145
AMS-4: No. 334835
ASP-2E: No. 079211
Shepherd Box Calibrator Model 89: 799063, 0011181

Miscellaneous Reports:
Out-Of-Tolerance Reports for instruments January 2008-July 2009
SCBA Personnel Qualifications List for Operations and Radiation Protection Personnel for Fit Test, Medical Examinations, Respirator Training, and Practical factors.
Monthly SCBA inspections per RT-0-111-900-0 from January 2008-July 2009

SCBA Packs Inspected includes Hydrostatic Test, Flow test, and alarm test and associated maintenance records
Nos: 5, 262, 238, 244, 266, 398,

Section 2PS1 Radioactive Gaseous and Liquid Effluent Treatment and Monitoring Systems

Procedures:
ST-2-026-414-0, Radioactive Gaseous Effluent Monitoring - North Stack Effluent Monitor Channel A Calibration/Functional Test
ST-2-026-415-0, Radioactive Gaseous Effluent Monitoring - North Stack Effluent Monitor Channel B Calibration/Functional Test
ST-2-026-438-0, Accident Monitoring North Stack Wide Range Accident Monitor Calibration/Functional Test
ST-2-026-442-1/2, Radioactive Gaseous Effluent Monitor – Flow Rate Calibration/Functional Test
ST-2-012-404-0, Radiation Monitoring - RHR Service Water Radiation Monitor, Division I, Channel A Calibration/Functional Test
ST-2-012-405-0, Radiation Monitoring - RHR Service Water Radiation Monitor, Division I, Channel B Calibration/Functional Test
ST-2-063-400-0, Radioactive Liquid Effluent Monitoring - Liquid Radwaste Effluent Line Calibration/Functional Test
ST-2-063-600-0, Radioactive Liquid Effluent Monitoring-Liquid Radwaste Effluent line Functional Test
ST-2-063-601/602-0, Radioactive Liquid Effluent Monitoring-Radwaste Discharge Pipe Flow Calibration/Functional Test
ST-4-076-801-0, A Standby Gas Treatment System (SBGT) Charcoal Analysis
ST-4-076-321-0, A SBGT Charcoal Absorber/HEPA Test
ST-4-076-802-0, B SBGT Charcoal Analysis
ST-4-076-322-0, B SBGT Charcoal Absorber/HEPA Test
ST-4-078-801-0, A Control Room Emergency Fresh Air System (CREFAS) Charcoal Analysis
ST-4-078-731-0, A CREFAS Charcoal Absorber/HEPA Test
ST-4-078-802-0, B CREFAS Charcoal Analysis
ST-4-078-732-0, B CREFAS Charcoal Absorber/HEPA Test
ST-4-076-806-1, A Reactor Enclosure Recirculation System (RERS) Charcoal Analysis
ST-4-076-321-1, A RERS Charcoal Absorber/HEPA Test
ST-4-076-807-1, B RERS Charcoal Analysis
ST-4-076-806-2, A RERS Charcoal Analysis
ST-4-076-321-2, A RERS Charcoal Absorber/HEPA Test
ST-4-076-807-2, B RERS Charcoal Analysis
ST-4-076-322-2, B RERS Charcoal Absorber/HEPA Test
ST-5-061-570-0, Radwaste Discharge Permit
ST-5-0612-810-0, Batch Liquid Waste Releases Monthly Composite Analysis and Liquid release dose calculations and setpoint determination for RISH-063-OK604
ST-5-076-815-0, North Stack Weekly Iodine and Particulate Analysis
ST-5-076-815-1, Unit 1 South Stack Weekly Iodine and Particulate Analysis

Unit 1 and Unit 2 gaseous and liquid release monitoring system STs
ST-2-026-400-1, South Stack Radiation Monitor, Unit 1 A;
ST-2-026-401-1, South Stack Radiation Monitor, Unit 1 B; and
ST-2-026-442-1, South Stack Flow Rate Monitor Cal/Functional Test.
ST-1-026-400-2, South Stack Radiation Monitor, Unit 2 A;

ST-2-026-401-2, South Stack Radiation Monitor, Unit 2 B; and
ST-2-026-442-2, South Stack Flow Rate Monitor Cal/Functional Test.
ST-2-026-414/415-0,,North Stack Radiation Monitor Cal/Functional Test A/B;
ST-2-026-440-0, North Stack Flow Rate Monitor Cal/Functional Test;
ST-2-026-438-0, Wide Range North Stack Monitor Cal/Functional Test;
ST-2-063-400-0, Liquid Effluent Radiation Monitor Cal Functional Test;
ST-2-063-600-0, Liquid Effluent Radiation Monitor Quarterly Functional Test;
ST-2-063-601-0, Liquid Effluent Radiation Monitor Cal/Functional Test; and
ST-2-063-602-0, Liquid Effluent Flow Rate Monitor Cal/Functional Test.
ST-5-076-815-2, Unit 2 South Stack Weekly Iodine and Particulate Analysis
ST-5-076-826-0, Monthly Gaseous Release Dose Calculations
CY-LG-170-202, Sampling of Noble Gas, Tritium, Iodine, and Particulate at the Gaseous Effluent Radiation Monitors
CY-LG-170-101, Radwaste Discharges
CY-LG-120-113Obtaining Samples from Radwaste Enclosure Sample Station

Gaseous and Liquid Discharges :
Monthly Gaseous Discharges for period January 2008-April 2009
Liquid Discharges Dated 7/02/09, 4/01/2009, 01/08/2009, 10/03/2008, 7/02/2008, 4/04/2008, 1/07/2008, 10/12/2007

Issue Reports:
749690, 829349, 895538, 842009, 850442, 881821, 804889, 891999, 813331, 801327, 802918, 798054, 791657, 764808, 746973, 706454, 154389, 736181, 739108, 700944, 700756, 676070, 686093, 692606, 675924, 666295, 555128

Nuclear Oversight Reports:
LS-AA-126-1001, Radiological Effluents Controls Program Self Assessment
NOSA-LIM-08-04, Radiolgical Effluents Audit

Miscellaneous Reports:
System Health Reports, Process Radiation Monitors, 2nd quarter 2009
2008 Annual Radioactive Effluent Release Report, No. 34, Limerick Generating Station
Offsite Dose Calculation Manual ODCM), Revision 24
ODCM Change Determination, AD-AA-101-F-01, Change 24
Control Room Daily Surveillance Log, ST-6-107-590-0

Section 4OA2: Problem Identification and Resolution

Procedures
E-D224-R-G, Loss of MCC D224-R-G, Revision 4
LS-AA-125, Corrective Action Program, Revision 13
LS-AA-125-1001, Root Cause Analysis Manual, Revision 7
M-093-004, 480 VAC MCC Breaker Assembly and Cubicle Terminal Maintenance, Revision 9
MA-AA-716-012, Post Maintenance Testing, Revision 11
MA-AA-716-230-1003, Thermography Program Guide, Revision 3
M-C-700-232, Testing and Control of 600V Class Molded Case Circuit Breakers, Revision 13
ST-6-092-312-1, D12 Diesel Generator Slow Start Operability Test Run, Revision 82

Drawings
E-16, Single Line Diagram 4kV Safeguard Power System, Revision 24
E-24, Single Line Load Center Load Tabulation D224, Revision 19
E-27, Single Line Diagram MCC Load Tabulation D224-R-G1, Revision 31
E-476, Schematic Diagram Drywell Area Unit Cooler, Revision 22
E-67, Single Line Diagram MCC Load Tabulation D224-R-G, Revision 44

Action Requests
A1311229
A1697245

Issue Reports

579675	798687	912016
597783	798687	914574
668047	874599	917210
772343	874677	919667
791656	910442	924627

Section 4OA3: Event Response

Other
Issue Resolution Documentation Form for IR 953620, dated 8/14/2009

LIST OF ACRONYMS

ADAMS	Agencywide Documents Access Management System
ARM	area radiation monitors
CAP	Corrective Action Program
CFR	Code of Federal Regulations
CREFAS	control room emergency fresh air system
EDG	emergency diesel generator
ERO	emergency response organization
ESW	emergency service water
HPCI	high pressure coolant injection
IMC	Inspection Manual Chapter
IR	issue report
ISFSI	interim spent fuel storage installation
LCO	limiting condition for operation
LER	licensee event report
MCC	motor control center
MCPR	minimum critical power ratio
MCU	motor control unit
NCV	non-cited violation
NOD	Nuclear Oversight Department
NRC	Nuclear Regulatory Commission
ODCM	offsite dose calculation manual
OOS	out of service
P&ID	piping and instrumentation drawing
PARS	Publicly Available Records
PCM	performance centered maintenance
PI	performance indicator
RCIC	reactor core isolation cooling
RHR	residual heat removal
RTP	rated thermal power
SCBA	self contained breathing apparatus
SDP	significance determination process
SGTS	standby gas treatment system
SSC	structure, system, component
ST	surveillance test
TB	Technical Bulletin
TS	technical specification
UFSAR	updated final safety analysis report
VAR	volt-ampere reactive
VHRA	very high radiation area