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

May 7, 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 05000352/2009002 AND 05000353/2009002

Dear Mr. Pardee:

On March 31, 2008, 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 April 10, 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). The 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 20555-001; 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.

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

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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 05000352/2009002 and 05000353/2009002
w/Attachment: Supplemental Information

cc w/encl:
C. Crane, President and Chief Operating Officer, Exelon Corporation
M. Pacilio, Chief Operating Officer, Exelon Nuclear
C. Mudrick, Site Vice President, Limerick Generating Station
E. Callan, Plant Manager, Limerick Generating Station
R. Kreider, Regulatory Assurance Manager, Limerick
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Chairman, Board of Supervisors of Limerick Township

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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

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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:	05000352/2009002 and 05000353/2009002
Licensee:	Exelon Generation Company, LLC
Facility:	Limerick Generating Station, Units 1 & 2
Location:	Sanatoga, PA 19464
Dates:	January 1, 2009 through March 31, 2009
Inspectors:	E. DiPaolo, Senior Resident Inspector N. Sieller, Resident Inspector T. Moslak, Health Physicist K. Young, Reactor Inspector S. Barr, Senior Emergency Prep Inspector
Approved by:	Paul G. Krohn, Chief Projects Branch 4 Division of Reactor Projects

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SUMMARY OF FINDINGS

IR 05000352/2009002, 05000353/2009002; 01/01/2009 - 03/31/2009; Limerick Generating Station, Units 1 and 2; Surveillance Testing and Permanent Plant Modifications.

The report covered a three-month period of inspection by resident inspectors and announced inspections by regional reactor inspectors. Two Green findings which were determined to be non-cited violations (NCVs) were identified. 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 January 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.

Cornerstone: Barrier Integrity

- Green. The inspectors identified a Green NCV of 10 CFR 50, Appendix B, Criterion III, "Design Control," for the failure to translate minimum room temperatures assumed in an isolation actuation instrumentation setpoint calculation into Unit 1 and 2 procedures such that reactor building room temperatures were maintained above the minimum assumed. As a result, the reactor enclosure and refueling area ventilation systems were not operated to assure that room temperatures were maintained above the minimum assumed in design basis calculations. Exelon entered the issue into the Corrective Action Program (CAP) for resolution.

  This finding was more than minor because it was associated with the Design Control attribute of the Barrier Integrity cornerstone, and affected the Barrier Integrity cornerstone objective to provide reasonable assurance that physical design barriers, including containment, protect the public from radionuclide releases caused by accidents or event. This finding was determined to be of very low safety significance because it did not represent an actual open pathway in the physical integrity of reactor containment, containment isolation system, and heat removal components. This finding has a cross-cutting aspect in Human Performance, Decision Making, because the licensee did not make a safety significant decision using a systematic process to ensure safety was maintained [H.1(a)]. Specifically, the decision to operate the reactor buildings at lower temperatures was made using an informal process within operations, therefore interdisciplinary input and a review by engineering and other support organizations was not obtained (Section 1R22).

Cornerstone: Mitigating Systems

- Severity Level IV. The inspectors identified a Severity Level IV NCV of 10 CFR 50.59, "Changes, Test, and Experiment," for failing to obtain a Technical Specification (TS) license amendment for a change made to the TS Bases concerning offsite power source operability. Changes made to TS Bases 3/4.8.1 required a change in the TS, because the change caused the bases to be in direct conflict with the requirements of TS Limiting Condition for Operation 3.8.1, "AC Sources Operating," through the application of associated TS surveillance requirements. Exelon entered this issue into the CAP and issued night orders to operators which required declaring an offsite power supply

inoperable when an offsite power supply feeder breaker became unavailable to an emergency bus.

Because this was a violation of 10 CFR 50.59, it was considered to be a violation which potentially impedes or impacts the regulatory process. Therefore, such violations are characterized using the traditional enforcement process. In this case, the licensee failed to perform an adequate safety evaluation in accordance with 10 CFR 50.59 because the approved change to the technical specification basis was in conflict with the TS surveillance requirements. This change required prior approval from the NRC before its implementation. Comparing this item to the examples in NUREG 1600, Supplement I, "Reactor Operations," this finding is more than minor because NRC approval would have been required. The inspectors completed a Significance Determination Review using NRC IMC 0609, Attachment 4, Phase 1 – Initial Screening and Characterization of Findings. Using the Phase I Screening worksheet the finding was determined to be of very low safety significance (Green) since the finding did not represent an actual loss of safety function for greater than the TS allowed outage time. Comparing this item to the examples in NUREG 1600, Supplement I, this finding is similar to Item D.5, "Violations of 10 CFR 50.59 that result in conditions evaluated as having very low safety significance (i.e., Green) by the SDP." This is an example of a Severity Level IV violation. Since the TS Bases change was made in 2000, the inspectors determined that this finding was not reflective of current licensee performance and, therefore, did not have a cross-cutting aspect. (Section 1R18)

Other Findings

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.

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REPORT DETAILS

Summary of Plant Status

Unit 1 began the inspection period operating at full rated thermal power (RTP). On January 19, operators reduced power to approximately 65 percent to facilitate scram time testing, a control rod sequence exchange, and condenser waterbox cleaning. The unit was restored to full power later that day. On March 13, a planned downpower to approximately 80 percent was performed for main turbine valve testing, main steam isolation valve testing, and fuel channel bow testing. The unit was restored to 100 percent power on March 14. Unit 1 operated at full RTP for the remainder of the inspection period.

Unit 2 began the inspection period operating at full RTP. On January 16, Unit 2 entered coastdown and feedwater temperature reduction operations, as planned, in advance of the Unit 2 refueling outage. On January 31, an unplanned downpower to approximately 72 percent was performed due to a loss of drywell cooling caused by a fault on a 480V motor control center (MCC). Unit 2 was restored to 100 percent power on February 1. On February 21, operators performed a planned downpower to approximately 80 percent to facilitate fuel channel bow testing. On February 22, the Unit was returned to its maximum attainable power of 99 percent. On March 19, Unit 2 experienced an unplanned downpower from 90 percent to 63 percent power when the 'B' reactor recirculation pump motor generator slowed to its minimum speed setting due to a power supply inverter inadvertently being switched off. The unit was restored to maximum attainable power later that day. On March 22, operators performed a reactor shutdown from 89 percent power to commence refueling outage 2R10. Unit 2 remained in the refueling outage 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)

External Flooding

a. Inspection Scope

The inspectors assessed the design and material condition of the Unit 2 emergency diesel generator (EDG) building to determine its ability to mitigate external flood conditions. The inspectors reviewed the licensee's Updated Final Safety Analysis Report (UFSAR) and Individual Plant Examination for External Events (IPEEE) to determine the requirements for the EDG building with respect to external flooding. The inspectors accessed the EDG building roof to ensure the drains were free of debris, there was no low-lying equipment that could be impacted by a maximum precipitation event, and the structure appeared sound. The inspectors also conducted a walkdown of the exterior walls of the EDG building to ensure there were no cracks in the structure or caulking that could allow water to enter the building.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment (71111.04Q - 3 samples)

Partial Walkdown

a. Inspection Scope

The inspectors performed partial walkdowns of the plant systems listed below to verify their operability when safety-related equipment in the opposite train was either inoperable, undergoing surveillance testing, or potentially degraded. The inspectors used TS, Exelon operating procedures, plant P&IDs, and the 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:

- EDG D14 return to standby lineup following monthly slow start test;
- Unit 1 High Pressure Coolant Injection (HPCI) system when Reactor Core Isolation Cooling System (RCIC) system was inoperable for planned maintenance; and
- Unit 2 'B' Loop of Residual Heat Removal (RHR) while in shutdown cooling.

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 administrative 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 out of service (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:

- EDG D14 Room, Fire Area 82;
- Unit 2 Safeguard System Access Area Room 370, Elevation 217', Fire Area 67;
- Unit 1 HPCI Pump Room,109, Elevation 177', Fire Area 34;
- Unit 2 Drywell, Fire Area 53; and
- Unit 2 Main Steam and Feedwater Pipe Tunnel, Fire Area 69.

1R07 Heat Sink Performance (71111.07 - 1 sample)

a. Inspection Scope

The inspectors reviewed the results of Exelon's thermal performance testing on the Unit 2 'B' RHR Heat Exchanger to assess the capability of the heat exchanger to function as designed. The inspectors reviewed the UFSAR, supporting design calculations, thermal performance calculations, and historical trend information to ensure the heat exchanger was capable of removing the required heat load during accident conditions. The inspectors verified that issues identified during the performance test were entered into the licensee's CAP for evaluation. Documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification Program (71111.11 - 1 sample)
Resident Inspector Quarterly Review

a. Inspection Scope

On February 3, 2009, the inspectors observed licensed operator simulator requalification training on the 'E' operating crew. Simulator Training Scenario LSTS-2053 tested the operators' ability to respond to failures of secondary plant equipment as well as a steam leak in the drywell with equipment OOS and emergency core cooling system failures. In addition, the inspectors observed refueling operations training on an operations staff crew on February 5, 2009. The training involved various refueling mode potential failures including lowering level in the reactor vessel cavity and spent fuel pool and a dropped fuel bundle. 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, and notifications. The inspectors observed training instructor critiques and assessed whether appropriate feedback was provided to the licensed operators.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12 - 1 sample)

a. Inspection Scope

The inspectors evaluated Exelon's work practices and follow-up corrective actions for issues identified in Issue Report (IR) 721408 which described an EDG D23 undervoltage condition experienced during surveillance testing, to assess the effectiveness of Exelon's maintenance activities. The inspectors reviewed the performance history of EDG D23 and assessed Exelon's extent-of-condition determination for potential common cause or generic implications to evaluate the adequacy of the station's corrective actions. The inspectors assessed Exelon's problem identification and resolution actions

for these issues to evaluate whether Exelon had appropriately monitored, evaluated, and dispositioned the issue 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 EDG classifications, performance criteria and goals, and Exelon's corrective actions that were taken or planned, to evaluate whether the actions were reasonable and appropriate.

a. Findings

No findings of significance were identified.

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:

- IR 866262, Online risk transition to 'Yellow' during troubleshooting and post maintenance testing EDG D24 indicated speed oscillations;
- Replace Unit 1 recirculation motor generator set generator brushes (production risk activity) while one offsite power source was unavailable;
- IR 874599, Loss of power to 480 volt motor control center, D224-R-G;
- IR 891128, Unable to reset one-half scram on Unit 2 due to failure of reactor protection system relay C71A-K14H; and
- IR 894839, Unit 2 inverter ELS-XX-219 inadvertently shut off resulting in 'B' recirculation pump speed reduction.

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 issue reports to verify that Exelon identified and corrected deficiencies associated with

operability evaluations. The documents reviewed are listed in the Attachment. The inspectors performed the following evaluations:

- IR 866263, EDG D24 speed oscillations common cause evaluation;
- IR 871440, Control rod 06-23 required increased drive pressure to insert;
- IR 874596, Drywell mixing fan 2B2-V212 failed to start in automatic when drywell mixing fan 2B1-V212 failed;
- IR 857478, Unit 1 'B' RHR pump minimum flow valve closed after being opened during pump test;
- IR 885367, Unit 1 'A' reactor enclosure recirculation fan tripped during post maintenance test run; and
- IR 895737, Unit 1 HPCI indicated discharge flow below TS minimum.

b. Findings

No findings of significance were identified.

1R18 Plant Modifications (71111.18 - 1 sample)

.1 Temporary Modifications

a. Inspection Scope

The inspectors reviewed the temporary plant modification to provide an alternate method of monitoring for a reactor cavity well seal leak during the Unit 2 2R10 refueling outage. The alternate method was necessary due to degraded operation of the normal method which is via a flow detector monitoring leakby to the radioactive waste system. The inspectors reviewed the associated Safety Evaluation LG-2009-E002, to ensure that the design of the temporary change could fulfill the UFSAR described function. The inspectors ensured that station personnel implemented the modification in accordance with the temporary configuration change process. The inspectors verified that modification preparation, staging, and implementation did not impair emergency/ abnormal operating procedure actions and key safety functions. Post-installation testing was reviewed to confirm that the modification could fulfill the intended function. The inspectors confirmed that supplemental checks for leakby using the alternate method were performed, as indicated in operator logs, when reactor cavity flood-up operations were ongoing during the Unit 2 2R10 refueling outage. Documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

.2 Permanent Modifications

(Closed) URI 05000352, 05000353/2008005-01, Changes to Technical Specification 3.8.1 Bases

a. Inspection Scope

In inspection report 2008005, dated January 30, 2009, the inspectors opened a URI pertaining to changes Exelon made to the bases for TS 3.8.1. The inspectors identified that the changes made by Exelon appeared to be in conflict with the requirements of TS LCO 3.8.1.1, and therefore should have required NRC review. Exelon agreed to provide additional information to the NRC to demonstrate that the changes made to the TS bases did not conflict with the requirements of TS LCO 3.8.1.1, and therefore did not require prior NRC approval. On February 24, 2009, Exelon provided additional information to the NRC. The information was reviewed by the resident inspectors as well as several technical experts in NRC Region I and the Office of Nuclear Reactor Regulation (NRR). The NRC determined that the information did not provide any new information that would cause the agency to change its position. Therefore, the URI is being dispositioned as a non-cited violation, as described below. This URI is closed.

b. Findings

Introduction: The inspectors identified a Severity Level IV NCV of 10 CFR 50.59, "Changes, Test, and Experiment," for failing to obtain a TS license amendment for a change made to the TS Bases, which resulted in the TS surveillance requirements to be misinterpreted. As a result, Limerick failed to enter the appropriate TS Action Statement on numerous occasions between 2000 and 2008 for an Emergency AC power source being inoperable.

Description: On September 30, 2008, operators racked out one of the two offsite power supply feeder breakers to 4kV Emergency Bus D11 (201-D11) for maintenance. The inspectors noted that although one of the two offsite power sources was not available to Emergency Bus D11, operators did not declare the associated offsite power circuit inoperable and enter into the associated 72-hour action statement per TS LCO 3.8.1.1, "AC Sources – Operating." The inspectors noted that one of the associated surveillance requirements, TS SR 4.8.1.1.1.b, could not be met with one of the two offsite power source breakers racked out. The SR states "Each of the above required independent circuits between the offsite transmission network and the onsite Class 1E distribution system shall be demonstrated OPERABLE in accordance with the Surveillance Frequency Control Program by transferring, manually and automatically, unit power supply from the normal circuit to the alternate circuit." With an offsite power supply feeder breaker racked out, manual and automatic transfer between the normal and alternate circuit was not possible.

The inspectors further noted that Limerick TS SR 4.0.1 states, in part, that, "Failure to meet a surveillance, whether such failure is experienced during the performance of a Surveillance or between performances of the Surveillance, shall be failure to meet the Limiting Condition for Operation." The inspectors determined that because Limerick could not meet the requirements of SR 4.8.1.1.b with one of the offsite breakers racked out, they should have declared the offsite power source inoperable and entered TS LCO 3.8.1.1.

The inspectors reviewed Limerick TS Bases 3/4.8.1, and found that the bases described that an offsite circuit was to be considered inoperable if it was not capable of supplying at least three Unit 1 4kV emergency buses. Recognizing that the TS Bases 3/4.8.1 appeared to conflict with the SR, the inspectors questioned the history of the bases. Exelon informed the inspectors that the bases were modified in 2000 to define an operable offsite source as one capable of supplying power to three of the four emergency buses in the unit, through Engineering Change Request (ECR) LGS ECR

99-00682. The inspectors reviewed LGS ECR 99-00682 and found that Exelon's 10 CFR 50.59 screening for the TS bases change concluded that the change was considered an enhancement, and therefore a formal TS amendment was not required. The ECR did not address the apparent conflict between the requirements of TS SR 4.8.1.1.b and the proposed modification to the bases.

Making the TS bases change without changing the TS was contrary to 10 CFR 50.59 (c)(1)(i) which states that "a licensee may make changes in the facility as described in the final safety analysis report…without obtaining a license amendment pursuant to [paragraph] 50.90 only if a change to the technical specifications incorporated in the license is not required." Exelon entered this issue into the CAP as IR 825317. Night orders were issued to operators, which required declaring an offsite power supply inoperable when an offsite power supply feeder breaker became unavailable to an emergency bus.

Analysis: The performance deficiency associated with this finding is that the change to TS Bases 3/4.8.1 required a change in the TS incorporated in the license, because it caused the bases to be in direct conflict with the requirements of TS LCO 3.8.1.1 through the application of SR 4.8.1.1.1.b and SR 4.0.1. Because this was a violation of 10 CFR 50.59, it was considered to be a violation which potentially impedes or impacts the regulatory process. Therefore, such violations are characterized using traditional enforcement process. In this case, the licensee failed to perform an adequate safety evaluation in accordance with 10 CFR 50.59 because the approved change to the technical specification basis was in conflict with the TS surveillance requirements. Thus, the TS basis change effectively removed the TS surveillance requirement to demonstrate operability. This change required prior approval from the NRC before its implementation. Comparing this item to the examples in NUREG 1600 Supplement I, "Reactor Operations," this finding is more than minor because NRC approval would have been required.

The inspectors completed a Significance Determination Review using NRC IMC 0609, Attachment 4, Phase 1 – Initial Screening and Characterization of Findings. Using the Phase I Screening worksheet for the Mitigating System Cornerstone, the finding was determined to be of very low safety significance (Green) since the finding did not represent an actual loss of safety function for greater than the TS allowed outage time. Comparing this item to the examples in NUREG 1600 Supplement I, this finding is similar to Item D.5, "Violations of 10 CFR 50.59 that result in conditions evaluated as having very low safety significance (i.e., green) by the SDP." This is an example of a Severity Level IV violation.

Since the TS Bases change was made in 2000, 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 50.59 (c)(1)(i) requires, in part, that a licensee may make changes in the facility as described in the final safety analysis report without obtaining a license amendment pursuant to 10 CFR 50.90 only if a change to the TS incorporated in the license is not required. Contrary to the above, on December 6, 2000, Exelon made a change to TS Bases 3/4.8.1, which conflicted with the requirements of TS LCO 3.8.1.1, and failed to obtain a TS license amendment as required.

This violation was of very low safety significance and did not represent a condition where the licensee failed to restore compliance within a reasonable time; was not repetitive; did not appear to have any willful aspects; and was entered into the licensee's CAP (IR 825317), this violation is being treated as an NCV, consistent with Section VI.A.1 of the Enforcement Policy. **(NCV 05000352, 353/2009002-02, Failure to Obtain License Amendment for TS Bases Change**)

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 inspectors performed the following samples:

- CO227197, Repair time delay circuit relay associated with RHR heat exchanger bypass valve, HV-C-051-1F048A;
- C0226630, Repair EDG D12 air cooler coolant heat exchanger thermostatic control valve, TCV-092-120B;
- R1102448, Routine inspection of reactor enclosure recirculation system damper; FD-C-076-192-A-OP;
- C0227323, Investigate oscillating speed indication on EDG D24;
- C0226265, Volatile chemical evaluation of reactor enclosure recirculation and standby gas treatment charcoal trains following painting of Unit 2 reactor building 253' elevation; and
- C0227874 Replace reactor protection system relay; C71A-K14H.

b. Findings

No findings of significance were identified.

1R20 Refueling and Other Outage Activities (71111.20 - 1 partial sample)

a. Inspection Scope

The inspectors reviewed the station's work schedule and outage risk plan for the Limerick Unit 2 maintenance and refueling outage (2R10), which commenced on March 23, 2009. The inspectors reviewed Exelon's development and implementation of outage plans and schedules to verify that risk, industry experience, previous site-specific problems, and defense-in-depth were considered. At the end of the inspection period, Unit 2 was in Operational Condition (OPCON) 5, Refueling with the reactor cavity flooded. This sample will be completed in the second quarter after the unit returns to OPCON 1. Documents reviewed are listed in the Attachment. During the outage, the inspectors observed portions of the shutdown and cooldown processes and monitored Exelon controls associated with the following outage activities:

- Configuration management, including maintenance of defense-in-depth, commensurate with the outage plan for the key safety functions and compliance with the applicable TS when taking equipment out of service;
- Post shutdown primary containment walkdown to identify any abnormal conditions that may have existed during the previous operating cycle;
- Implementation of clearance activities and confirmation that tags were properly hung and that equipment was appropriately configured to safely support the associated work or testing;
- Installation and configuration of reactor coolant pressure, level, and temperature instruments to provide accurate indication and instrument error accounting;
- Status and configuration of electrical systems and switchyard activities to ensure that TS were met;
- Monitoring of decay heat removal operations;
- Impact of outage work on the ability of the operators to operate the spent fuel pool cooling system;
- Reactor water inventory controls, including flow paths, configurations, alternative means for inventory additions, and controls to prevent inventory loss;
- Activities that could affect reactivity;
- Maintenance of secondary containment as required by TS;
- Refueling activities, including fuel handling and fuel receipt inspections; and
- Identification and resolution of problems related to refueling outage activities.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22 - 6 samples)

a. Inspection Scope

The inspectors either witnessed the performance of, or reviewed test data for, six surveillance tests (STs) associated with risk-significant structure, system, components (SSC). 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 inspectors reviewed STs for the following systems and components:

- ST-6-107-590, Daily Surveillance Log/OPCONS 1, 2, 3, Revision 147, performed during the week of January 12, 2009;
- ST-6—012-231-0. 'A' Loop Residual Heat Removal Service Water (RHRSW) Pump, Valve Flow Test, Revision 58 (In-service Test);
- ST-4-078-801-0, 'A' Control Room Emergency Fresh Air Supply (CREFAS) Charcoal Analysis, Revision 6;
- RT-3-047-64D-2, Unit 2 Fuel Channel Bow Monitoring, Revision 9;
- ST-6-047-750-1, Control Rod Drive Accumulator Pressure Check, Revision 18; and
- ST-4-LLR-031-2, ST-4-LLR-051-2, ST-4-LLR-051-2, ST-4-LLR-061-2, Local Leak Rate Testing for 'A-D' Main Steam Isolation Valves, Revision 8.

b. Findings

Introduction: The inspectors identified a Green NCV of 10CFR50, Appendix B, Criterion III, "Design Control," for the failure to translate minimum room temperatures assumed in an isolation actuation instrumentation setpoint calculation into Unit 1 and 2 procedures such that such that reactor building room temperatures were maintained above the minimum assumed. As a result, in December 2008, temperatures in several reactor building rooms fell below the minimum design basis temperature.

Description: On December 26, 2008, IR 860165 was written to document out-of-specification control rod drive (CRD) accumulator nitrogen pressures. The pressures were low due to low ambient reactor building temperatures in Units 1 and 2. The inspector reviewed the issue and determined that there were no operability issues with the low out-of-specification accumulator pressures. This was because pressures were being maintained greater than 1000 psig, which was above TS Surveillance Requirement (SR) minimum pressure of 955 psig, and there was a low pressure alarm set at 970 psig to alert operators prior to exceeding the TS value. Nonetheless, as a result of IR 860165, Exelon began maintaining reactor building temperatures at higher values.

The inspectors reviewed the history of reactor building temperatures. The inspectors noted that ST-6-107-590-1 and -2, Daily Surveillances Log/OpCons 1, 2, and 3, recorded lower than normal temperatures in several rooms in Units 1 and 2 during the December 2008 time frame. The inspectors noted that the lowest temperature recorded in Unit 1 was 44˚F in the Reactor Water Cleanup (RWCU) Pump Room 'B' on December 26, 2008, and 45˚F in the Unit 2 RWCU Pump Room 'B' on December 12, 2008.

Prior to the onset of seasonably cold weather in 2008, Limerick Operations personnel performed an informal review to determine if any operating restrictions would preclude lower reactor building temperatures. Having found no procedural restrictions, informal guidance for operating the reactor enclosure and refueling area ventilation system was conveyed to operators, which resulted in operating the Units 1 and 2 at lower than normal temperatures. Operations did not consult with engineering or other support organizations prior to changing the operating guidance for this system. The inspectors noted that ST-6-107-590-1 and -2 did not specify a minimum allowed temperature; only a normal band was given.

The inspectors discovered that the UFSAR Section 9.4.2 describes the Reactor Enclosure and Refueling Area Ventilation System as being designed to maintain space temperatures so that the minimum temperature is not below 65˚F. The inspectors identified that Calculation MISC-22, "Leak Detection System Setpoint Bases," Revision 6, specified 65˚F as the assumed minimum initial temperature in reactor building rooms. MISC-22 was used as the basis for room temperature instrument setpoints specified in TS LCO 3.3.2, "Isolation Actuation System." The inspectors noted that initial room temperatures less than 65˚F would have a non-conservative effect on isolation system operation due to room high temperature. This is because room heatup to the specified high temperature instrument setpoint would take longer for any given size pipe break in the room.

This issue was within Exelon's ability to foresee and prevent, because the temperatures in those room were significantly below the normal bands and there were several opportunities to identify this abnormal condition and question if system operability was affected by this abnormal condition.

Analysis: The performance deficiency associated with this issue is that both the ST-6-107-590-1 and -2, Daily Surveillances Log/OpCons 1, 2, and 3 and the reactor enclosure and refueling area ventilation system operating procedures did not contain minimum temperature limits to ensure design basis limits were maintained. As a result, in December 2008, the reactor enclosure and refueling area ventilation systems were not operated to assure that room temperatures were maintained above the minimum assumed in design basis calculations. This resulted in rooms associated with the Unit 1 and Unit 2 RWCU Systems being operated at temperatures below the minimum assumed in Calculation MISC-22, "Leak Detection System Setpoint Bases." This finding was more than minor because it was associated with the Design Control attribute of the Barrier Integrity cornerstone, and affected the Barrier Integrity cornerstone objective to provide reasonable assurance that physical design barriers, including containment, protect the public from radionuclide releases caused by accidents or event. In accordance with NRC IMC 0609, Attachment 4, Phase 1 – Initial Screening and Characterization of Findings, the inspectors determined the finding to be of very low safety significance (Green) because it did not represent an actual open pathway in the physical integrity of reactor containment, containment isolation system, and heat removal components.

This finding has a cross-cutting aspect in Human Performance, Decision Making, because the licensee did not make a safety significant decision using a systematic process to ensure safety was maintained. Specifically, the decision to operate the reactor buildings at lower temperatures was made using an informal process within operation, therefore, interdisciplinary input and a review by engineering and other support organizations was not obtained. [H.1(a)]

Enforcement: 10CFR50, Appendix B, Criterion III, "Design Control," requires that measures shall be established to assure that applicable regulatory requirements and the design basis … those structures, systems, and components to which this appendix applies are correctly translated into specifications, drawings, procedures, and instructions. Contrary to the above, minimum room temperatures assumed in Calculation MISC-22 for isolation actuation instrumentation setpoints were not translated into procedures such that Units 1 and 2 reactor building room temperatures were maintained above the minimum assumed in design basis calculations. As a result, RWCU System rooms in Units 1 and 2 were operated below the minimum temperature assumed in Calculation MISC-22 for Technical Specification isolation activation systems during several periods in December 2008. Because this issue is of very low safety significance and has been entered into the CAP as IR 895483, this violation is being treated as an NCV, consistent with Section VI.A of the NRC Enforcement Policy. **(NCV 05000352, 353/2009002-01, Failure to Maintain Design Control for Reactor Building Temperatures)**

1EP2 Alert and Notification System (ANS) Evaluation (71114.02 - 1 sample)

a. Inspection Scope

An onsite review was conducted to assess the maintenance and testing of the Limerick ANS. During this inspection, the inspectors interviewed the Exelon Facility and Equipment Coordinator, who is responsible for implementation of ANS testing and maintenance. The inspector discussed with the Coordinator the performance of the ANS siren system and IRs written to address ANS issues. The inspector reviewed the ANS

procedures and the ANS design report to ensure Exelon's compliance with those commitments for system maintenance and testing. The inspector observed a complete ANS siren test. Additionally, the inspector reviewed changes to the design report and how the licensee incorporated the changes into the ANS program. The inspection was conducted in accordance with NRC Inspection Procedure (IP) 71114, Attachment .02. Planning Standard, 10 CFR 50.47(b)(5) and the related requirements of 10 CFR 50, Appendix E, were used as reference criteria. Documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

1EP3 Emergency Response Organization (ERO) Staffing and Augmentation System (71114.03 - 1 sample)

a. Inspection Scope

The inspector conducted a review of Limerick's ERO augmentation staffing requirements and the process for notifying and augmenting the ERO. This was performed to ensure the readiness of key staff to respond to an event and to ensure timely emergency response facility activation. The inspector reviewed procedures and IRs associated with the ERO notification system and drills, and reviewed records from call-in drills. The inspector interviewed personnel responsible for testing the ERO augmentation process, and reviewed the training records for the ERO to ensure training and qualifications were current. The inspector further verified a sampling of ERO participation in exercises and drills in 2008 and 2009. The inspection was conducted in accordance with NRC IP 71114, Attachment .03, Planning Standard, 10 CFR 50.47(b)(2), and related requirements of 10 CFR 50, Appendix E, were used as reference criteria. Documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

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

a. Inspection Scope

Prior to this inspection, the NRC had received and acknowledged changes made to the Limerick Emergency Plan and its implementing procedures. Exelon developed these changes in accordance with 10 CFR 50.54(q), and determined that the changes did not result in a decrease in effectiveness of the Plan. The licensee also determined that the Plan continued to meet the requirements of 10 CFR 50.47(b) and Appendix E to 10 CFR 50. During this inspection, the inspector conducted a review of Limerick's 10 CFR 50.54(q) screenings for all changes made to the EALs, and for a sample of the changes made to the Plan, from August 2008 through March 2009, that could have potentially resulted in a decrease in effectiveness. This review of the EAL and Plan changes did not constitute NRC approval of the changes and, as such, the changes remain subject to future NRC inspection. The inspection was conducted in accordance with NRC IP 71114, Attachment 4. The requirements in 10 CFR 50.54(q) were used as reference criteria. Documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

1EP5 Correction of Emergency Preparedness (EP) Weaknesses (71114.05 - 1 sample)

a. Inspection Scope

The inspector reviewed a sampling of self-assessment procedures and reports to assess Exelon's ability to evaluate their EP performance and programs. The inspector reviewed a sampling of EP drill reports and EP IRs, from January 2008 through March 2009, initiated by Exelon at Limerick from drills, self-assessments, and audits. Additionally, the inspector reviewed Limerick's Quality Assurance audits and reports, and the 2007 and 2008 10 CFR 50.54(t) audit reports. This inspection was conducted in accordance with NRC IP 71114, Attachment .05, Planning Standard, 10 CFR 50.47(b)(14), and the related requirements of 10 CFR 50 Appendix E were used as reference criteria. Documents reviewed are listed in the Attachment.

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

2OS1 Access Control to Radiologically Significant Areas (71121.01 - 10 samples)

a. Inspection Scope

During the period January 12 - 16, 2009, the inspector conducted the following activities to verify that the licensee was properly implementing physical, administrative, and engineering controls for access to locked high radiation areas and other 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 20, Technical Specifications, and the licensee's procedures. This inspection activity represents completion of ten samples relative to this inspection area. The documents reviewed are listed in the Attachment.

Plant Walkdown and RWP Reviews

- The inspector identified exposure significant work areas in the Unit 1 and Unit 2 reactor buildings, refuel floor, and waste processing building. Specific work activities included Unit 1 hydraulic control unit (HCU) maintenance, Unit 2 scaffolding erection, reactor cavity work platform (RCWP) maintenance, and waste sludge tank inspection. The inspector reviewed radiation survey maps and radiation work permits (RWP) associated with these areas to determine if the associated controls were acceptable. RWPs reviewed included LG-0-09-00107 (HCU Maintenance), LG-0-09-00057 (Maintenance & Outage Services), and LG-0-09-00003 (Open/Inspect Waste Sludge Tank).
- The inspector toured the accessible radiological controlled areas in both units, including the reactor buildings, waste processing building, and refuel floor, and with

the assistance of a radiation protection technician performed independent surveys of selected areas to confirm the accuracy of survey data and the adequacy of postings.

- In evaluating the RWPs, the inspector reviewed electronic dosimeter dose/dose rate alarm set points to determine if the set points were consistent with the survey indications and plant policy. The inspector verified that the workers were knowledgeable of the actions to be taken when the dosimeter alarms, or malfunctions, for tasks being performed under selected RWPs.
- The inspector reviewed RWPs and associated instrumentation and engineering controls for potential airborne radioactivity areas located in the reactor buildings, waste processing building, and fuel floor. The inspector reviewed dose assessment records related to evaluating airborne radioactivity concentrations and personnel contaminations and confirmed that no worker received an internal dose, in excess of 50 mrem, when performing radiological significant tasks. The inspector reviewed the dose assessment methodology for an internal exposure that was less than 50 mrem to confirm the accuracy of the results.

Problem Identification and Resolution

- A review of Nuclear Oversight objective evidence reports, Common Cause Analyses, and an Apparent Cause Evaluation, was performed to determine if identified problems and negative performance trends were entered into the corrective action program and evaluated for resolution.
- Relevant IRs, associated with radiation protection control access, initiated between January 2008 through January 2009 were reviewed and discussed with the licensee staff to determine if the follow-up activities were being conducted in an effective and timely manner, commensurate with their safety significance.

High Radiation Area and Very High Radiation Area Controls

- Procedures for controlling access to High Radiation Areas (HRA) and Very High Radiation Areas (VHRA) were reviewed to determine if the administrative and physical controls were adequate. The inspector also reviewed the physical and procedural controls for securing and removing highly contaminated/activated materials stored in the spent fuel pool. The inspector discussed with radiation protection management, the adequacy of current locked high radiation areas (LHRA)/VHRA controls, including prerequisite communications and authorizations, and verified that any changes made to relevant procedures did not substantially reduce the effectiveness and level of worker protection. Keys to LHRA and VHRA were inventoried and accessible LHRAs were verified to be properly secured and posted during plant tours in both units.

Radiation Worker Performance and Radiation Protection Technician Performance

- The inspector observed and questioned radiation workers and radiation protection technicians regarding radiological controls applied to various tasks, including waste sludge tank inspections, RCWP maintenance, HCU maintenance, and Unit 2 scaffolding erection. The inspector performed these activities to determine whether the workers were aware of current RWP requirements, radiological conditions, access controls, and that the skill level was appropriate with respect to the potential radiological hazards and the work involved.

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

b. Findings

No findings of significance were identified.

2OS2 ALARA Planning and Controls (71121.02 - 7 samples)

a. Inspection Scope

During the period January 12 - 16, 2009, the inspector conducted the following activities to verify that the licensee was properly implementing operational, engineering, and administrative controls to maintain personnel exposure as low as is reasonably achievable (ALARA) for tasks performed during 2008 and in making preparations for the Unit 2 refueling outage (2R10). Implementation of these controls 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. This inspection represents completion of seven samples relative to this inspection area.

Radiological Work Planning

- The inspector reviewed pertinent information regarding the 2008 1R12 outage exposure history, current exposure trends, and ongoing activities to assess current performance and 2R10 outage exposure challenges. A review of 2008 outage performance was conducted to compare actual exposures with forecasted estimates to determine if differences were properly addressed in Work-In-Progress and Post-Job ALARA reviews and by the Station ALARA Council.
- The inspector reviewed the 2R10 outage work scheduled during the upcoming spring refueling outage period and the associated work activity dose estimates and ALARA Plans. Scheduled work includes the in-service inspection of the Unit 2 reactor pressure vessel nozzles and the associated hydrolazing and installation of temporary shielding. Additional projects included suppression pool inspections, core shroud weld examinations, and jet pump repairs.
- The inspector evaluated the departmental interfaces between radiation protection, operations, maintenance crafts, and engineering to identify missing ALARA program elements and interface problems. The evaluation was accomplished by attending a pre-job briefing for opening and inspecting a waste sludge tank; reviewing recent Station ALARA Council meeting minutes, work-in-progress/post-job ALARA reviews, Nuclear Oversight Objective Evidence Reports; and interviewing the site Radiation Protection Manager.

Verification of Dose Estimates

- The inspector reviewed the assumptions and basis for the annual (2009) site collective exposure projections for the 2R10 outage and for routine power operations.

- The inspector reviewed the licensee's procedures associated with monitoring and re-evaluating dose estimates when the forecasted cumulative exposure for tasks differed from the actual exposure received. The inspector reviewed the dose/dose

rate alarm reports, work-in-progress evaluations, and exposure data for selected individuals receiving the highest Total Effective Dose Equivalent (TEDE) for 2008 to confirm that no individual exposure exceeded the regulatory limit, or met the performance indicator reporting guideline.

Jobs-In-Progress

- The inspector observed various jobs-in-progress to evaluate the effectiveness of dose control measures. Jobs observed included a waste sludge tank inspection, scaffolding installation, HCU maintenance, and reactor cavity work platform maintenance. As part of this evaluation, the inspector reviewed the RWP, survey maps, and contamination control measures. The inspector attended the pre-job briefing for the waste sludge tank inspection. The inspector also determined that workers were properly wearing dosimetry and were knowledgeable of RWP requirements.

Problem Identification and Resolution

- The inspector reviewed elements of the licensee's corrective action program related to implementing ALARA program controls, including Issue Reports, Nuclear Oversight Objective Evidence reports, dose/dose rate alarm reports, and Station ALARA Committee meeting minutes to determine if problems were being entered at a conservative threshold and resolved in a timely manner.

b. Findings

No findings of significance were identified.

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

a. Inspection Scope

During the period January 12 - 16, 2009, the inspector conducted the following activities to evaluate the operability and accuracy of radiation monitoring instrumentation that was used for the protection of workers. The criteria contained in 10 CFR 20, applicable industry standards, and the licensee's procedures were used to evaluate the adequacy of these instruments. The documents reviewed are listed in the Attachment.

The calibration procedures, related records, and quality control checks for the Canberra FastScan and AccuScan whole body counting systems were reviewed.

The inspector reviewed the training materials for recently purchased hand held portable survey instruments including the Eberline ASP-2E and RM-25, the Merin Gerin RAM GAM, and Bicron RSO-50E.

b. Findings

No findings of significance were identified.

2PS3 Radiological Environmental Monitoring Program and Radioactive Material Control Program (71122.03 - 10 samples)

a. Inspection Scope

During the period March 9 - 17, 2009, the inspector conducted the following activities to verify that the licensee implemented the radiological environmental monitoring program (REMP) consistent with the Site Technical Specifications and the Off-Site Dose Calculation Manual (ODCM) to validate that radioactive effluent releases met the design objectives of Appendix I to 10 CFR 50.

Additionally, the inspector verified that radiological surveys and controls were adequate to prevent the inadvertent release of radioactive material into the public domain. Implementation of these controls was reviewed against the criteria contained in 10 CFR 20 & 50, relevant Technical Specifications, and the licensee's procedures.

This inspection activity represents completion of ten samples relative to this inspection area.

REMP Inspections:

- The inspector reviewed the 2007 Annual Radiological Environmental Operating Report and the 2008 Land Use Census Report to verify that the environmental monitoring programs were implemented as required by the ODCM (Revision 24).
- The inspector walked down six (6) air particulate/iodine sampling stations (Nos. 10S3, 11S1, 11S2, 13C1, 14S1, 22G1), five (of 5) cow's milk sampling stations (Nos.10F4, 18E1, 19B1, 23F1, 25C1), four (of 4) drinking water stations (Nos. 15F4, 15F7, 16C2, 28F3), two (of 2) surface water sampling stations (24S1, 13B1), and seven (of 40) thermoluminescent (TLD) monitoring stations (10S3, 11S1, 13C1, 14S1, 21S2, 19D1, 34S2). The inspector determined if sampling locations were as described in the ODCM, and evaluated the sampling equipment material condition.
- As part of the walk down, the inspector observed the technician collect and prepare for analysis cow's milk samples, demonstrate water and air sample collection techniques, and verified that sampling techniques were performed in accordance with procedures.
- Based on direct observation and review of records, the inspector verified that the meteorological instrumentation was operable, calibrated, and maintained in accordance with the guidance contained in the FSAR, NRC Safety Guide 23, and the licensee/vendor procedures. The inspector verified that the meteorological data readout and recording instruments in the control room and at the primary and backup towers were operable for wind direction, wind speed, temperature, and delta temperature. The inspector observed calibration of the instrumentation on the primary tower and on the backup tower, on March 17 and 18, 2009, respectively. The inspector confirmed that redundant instrumentation was operable and that the annualized recovery rate for meteorological data was greater that 90%.
- During walkdowns, the inspector had technicians demonstrate the air and water sampling equipment was properly operating. The inspector reviewed maintenance records and operating parameter trending records for air samplers and water compositors.
- The inspector reviewed Issue Reports, Nuclear Oversight Audit/Assessment Reports, management evaluations of sample collection, REMP contractor audits, and departmental self-assessment reports, relevant to the ODCM requirements, to evaluate the threshold for which issues are entered into the corrective action

program, the adequacy of subsequent evaluations, and the effectiveness of the resolution

- The inspector reviewed the results of the licensee's quarterly laboratory cross-check program to verify the accuracy of the licensee's environmental air filter, charcoal cartridge, water, biota, and milk sample analyses.
- The inspector reviewed any significant changes made by the licensee to the ODCM as a result of changes to the land use census or sampler station modifications since the last inspection. The inspector also reviewed technical justifications for any change in sampling location (or frequency) and verified the licensee performed the reviews required to ensure that the changes did not affect its ability to monitor the radiological condition of the environment.

Unrestricted Release of Material from the Radiologically Controlled Area (RCA)

- The inspector reviewed the contamination control procedures and guidance provided to personnel for monitoring potentially contaminated material leaving the RCA for unrestricted use. During the inspection, the inspector determined that contamination monitoring was performed at appropriate locations within the facility to preclude release of material into the public domain.
- The inspector verified that the radiation monitoring instrumentation (SAM-9, SAM-11, Frisker) was appropriate for the radiation types potentially present and was calibrated with appropriate radiation sources. The inspector reviewed the licensee's criteria for the survey and release of potentially contaminated material; verified that there was guidance on how to respond to an alarm which indicates the presence of contamination; and reviewed instrument alarm set points to ensure that radiation detection sensitivities are consistent with the NRC guidance contained in IE Circular 81-07 and IE Information Notice 85-92 for surface contamination and HPPOS-221 for volumetrically contaminated material. The inspector also reviewed the licensee's procedures and records to verify that the radiation detection instrumentation was used at its typical sensitivity level based on appropriate counting parameters, and verified that the licensee has not established a release limit by altering the instruments sensitivity through such methods as raising the energy discrimination level or locating the instrument in a high radiation background area. With the assistance of a technician, the inspector verified that in-use monitors appropriately responded to a radioactive source check.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITES

4OA1 Performance Indicator (PI) Verification (71151 – 9 samples)

.1 Initiating Event and Mitigating Systems Cornerstone PIs

a. Inspection Scope

The inspectors sampled Exelon's submittal of the Mitigating Systems and Barrier Integrity cornerstone PIs listed below to verify the accuracy of the data recorded from January 2008 though December 2008, except as noted below. 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 (2 samples)

- Units 1 and 2 Unplanned Power Changed per 7000 critical hours (IE03)

Cornerstone: Mitigating Systems (4 samples)

- Units 1 and 2 MSPI: High Pressure Injection System (MS07)
- Units 1 and 2 MSPI: Heat Removal System (MS08) (April 2008-December 2008)

b. Findings

No findings of significance were identified.

.2 Emergency Preparedness Performance Indicator Verification

a. Inspection Scope

The inspector reviewed the Limerick PI data, its supporting documentation, and the information Exelon reported from the third and fourth quarters of 2008, to verify the accuracy of the reported data. The review of these PIs was conducted in accordance with NRC IP 71151. The acceptance criteria used for the review were 10 CFR 50.9 and NEI 99-02, Revision 5, "Regulatory Assessment Performance Indicator Guidelines." The documents reviewed are listed in the Attachment.

Cornerstone: Emergency Preparedness (3 samples)

- Common Drill and Exercise Performance (EP01)
- Common ERO Drill Participation (EP02)
- Common ANS Reliability (EP03)

b. Findings

No findings of significance were identified.

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

.1 Review of Items Entered into the Corrective Action Program

a. Inspection Scope

As required by IP 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. Documents reviewed are listed in the Attachment.

b. Findings and Observations

No findings of significance were identified.

.2 Annual Sample: Review of RCIC Pump Suction Alignment Issue and Areas for Improvement for Limerick Generating Station's Fire Protection Program

a. Inspection Scope

The inspectors selected IR 843591 and IR 859194 as problem identification and resolution (PI&R) samples for a detailed follow-up review. IR 843591 documented on November 11, 2008, an engineer participating in senior reactor operator certification training in the simulator observed that the remote shutdown procedure, SE-1, "Remote Shutdown," did not agree with the supporting design calculations for the fire safe shutdown method being implemented by the procedure. The calculations assumed that the RCIC pump suction would be aligned to the suppression pool during the remote shutdown event. The RCIC pump suction is aligned to the condensate storage tank (CST) during normal operation. The remote shutdown procedure did not contain the steps necessary to align the RCIC pump suction to the suppression pool during fire safe shutdown activities. IR 859194 identified areas of improvement in Limerick Generating Station's fire protection program. Focus areas included fire safe-shutdown procedures and guidelines, control transient combustibles, and fire protection backlog issues.

The inspectors assessed Exelon's problem identification threshold, cause analyses, extent-of-condition reviews, operability determinations, and the prioritization and timeliness of corrective actions to determine whether Exelon was appropriately identifying, characterizing, and correcting problems associated with these issues and whether the planned or completed corrective actions were appropriate to prevent recurrence. Additionally, the inspectors interviewed cognizant plant personnel regarding the identified issues. The documents reviewed are listed in the Attachment.

b. Findings and Observations

No findings of significance were identified.

The inspectors determined that Exelon properly implemented their corrective action process regarding the initial discovery of the above issues. The IR packages were complete and included cause evaluations, operability determinations, extent-of-condition reviews, corrective actions, and planned corrective actions. Additionally, the elements of the IR packages were detailed and thorough. Corrective actions were timely and appeared appropriate to prevent recurrence of the above issues. Corrective actions addressed immediate procedure concerns.

The inspectors determined that corrective actions included revising SE-1, "Remote Shutdown," to add the appropriate steps to align the RCIC pump suction to the

suppression pool as analyzed in the fire safe shutdown analysis. However, the licensee determined that additional extent of condition reviews were necessary to ensure all fire areas that credit RCIC alignment to the suppression pool were captured. Additionally, the licensee had to complete an additional revision of SE-1 that included a correction to a valve identification number associated with the RCIC pump suction from the suppression pool. This was a correction to a valve identification number that was added to the SE-1 procedure as a result of the initial identified deficiency.

.3 Annual Sample: Review EDG D23 Overvoltage and Subsequent Engineered Safety Feature Actuation

a. Inspection Scope

The inspectors reviewed Limerick's causal analysis, extent-of-condition, and corrective actions associated with IR 721408 regarding an overvoltage condition on EDG D23 while carrying the associated emergency bus during RHR pump loading. Operators manually tripped the EDG output breaker per procedure which caused actuation of the bus' undervoltage logic. The inspectors evaluated Exelon's actions against the requirements of the corrective action program and applicable regulatory requirements. The documents reviewed are listed in the Attachment.

b. Findings and Observations

No findings of significance were identified.

The inspectors assessed that Exelon's final causal analysis and corrective actions were appropriate and reasonable. However, the inspectors observed that there were some delays in completing the final causal analysis and establishing comprehensive corrective actions. This was primarily due to delays in removing the inactivated suspect voltage regulator rectifier from the D23 EAG. Although the failure occurred in January 2008 the rectifier was not removed and sent to the vendor for failure analysis until June 2008. Because the failure analysis revealed a different failure mechanism than originally suspected, a revision to the licensee event report (LER) describing the event was necessary. Following receipt of the failure analysis from the vendor, comprehensive corrective actions were promptly determined and implemented to assure that the same failure mechanism did not exist on the site's other EDGs.

4OA3 Event Follow-up (71153 - 6 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. The documents reviewed are listed in the Attachment.

- Unit 2 Loss of Motor Control Center D224-R-G and subsequent load drop to 72 percent power on January 31, 2009;
- Water discovered leaking from Units 1 and 2 Turbine Building blowout panels found to contain tritium; and
- Unit 2 unplanned downpower to 65 percent caused by 'B' recirculation pump speed reduction to minimum on March 19, 2009.

b. Findings

No findings of significance were identified.

.2 (Closed) Licensee Event Report (LER) 05000353/2008-001-01: Valid Actuation of the D23 Emergency Diesel Generator Bus Undervoltage Logic.

A valid actuation of the D23 EDG bus undervoltage minimum actuation logic occurred following manual operator action to mitigate a bus overvoltage condition during EDG post maintenance testing. The EDG overvoltage condition was caused by an intermittent failure of the #1 rectifier bank in the voltage regulator. The failure was caused by looseness at a bolted connection and corrosion at the rectifier flyback diode causing a high resistance. The high resistance caused a silicon controlled rectifier to fail to return to the "off" state which caused an overvoltage condition of the EDG. The LER was reviewed and no findings of significance were identified and no violation of NRC requirements occurred. This LER is closed.

.3 (Closed) LER 05000352/2008-003: High Pressure Coolant Injection System Instrument Power Supply Failure.

On November 2, 2008, the Unit 1 HPCI system was rendered inoperable due to observed oscillations in the system flow indication. The condition was corrected by recalibration of a flow transmitter, replacement of a square root converter, and replacement of a degraded inverter in the HPCI turbine control system. A failure analysis determined the most probable cause of the inverter component failure to be age-related degradation. Corrective actions included replacement of the inverter, increased monitoring of inverter performance, and increased replacement frequency of the inverter model in plant systems. The event was documented in Exelon's corrective action program as IR 839237. The LER was reviewed and no findings of significance were identified and no violation of NRC requirements occurred. This LER is closed.

.4 (Closed) LER 05000352, 05000353/2008-004: Remote Shutdown Procedure Error.

On November 11, 2008, an engineer participating in senior reactor operator certification training in the simulator observed that the remote shutdown procedure, SE-1, "Remote Shutdown," did not agree with the supporting design calculations for the fire safe-shutdown method being implemented by the procedure. The calculations assumed that the RCIC pump suction would be aligned to the suppression pool during the remote shutdown event. The RCIC pump suction is aligned to the CST during normal plant operation. The remote shutdown procedure did not contain steps necessary to align the RCIC pump suction to the suppression pool during fire safe shutdown activity. Contrary to TS 6.8.1.g, "Procedures and Programs," the licensee did not establish a safe shutdown procedure that was consistent with the fire safe shutdown analysis. The licensee determined that the condition was caused by a failure to include the required steps in the safe-shutdown procedure that were consistent with the fire safe-shutdown

analysis. Corrective actions included revising the remote shutdown procedure to include the necessary steps to align the RCIC pump suction to the suppression pool while operating the system from the remote shutdown panel. The deficiency was documented in Exelon's corrective action program as IR 843591. The enforcement aspects of this issue are discussed in section 4OA7. 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 TI 2515/173, Review of the Implementation of the Industry Ground Water Protection Voluntary Initiative (1 sample)

a. Inspection Scope

An NRC assessment was performed the week of March 9, 2009, of the licensee's implementation of the Nuclear Energy Institute – Voluntary Ground Water Protection Initiative (NEI 07-07, dated August 2007, ML072610036). The inspector verified that the licensee had evaluated work practices that could lead to leaks and spills, and has performed an evaluation of systems, structures, and components that contain licensed radioactive material to determine potential leak or spill mechanisms.

The licensee has completed a site characterization of geology and hydrology to determine the predominant ground water gradients and potential pathways for ground water migration from on-site locations to off-site locations. Monitoring wells have been installed at the appropriate locations and an on-site ground water sampling program has been implemented to monitor for potential licensed radioactive leakage into groundwater. The ground water monitoring results were being reported in the annual radiological environmental operating report.

The licensee has prepared procedures for the decision making process for potential remediation of leaks and spills, including consideration of the long term decommissioning impacts. Records of leaks and spills are being recorded in the licensee's decommissioning files in accordance with 10 CFR 50.75(g).

The licensee has identified the appropriate local and state officials and has conducted briefings on the licensee's ground water protection initiative. Protocols have been

established for notification to these local and state officials regarding detection of leaks and spills.

b. Findings and Observations

No findings of significance were identified.

.3 (Closed) Unresolved Item (URI) 05000352, 05000353/2001014-01, Reliance on an Assumption of a Single Spurious Malfunction of Safe Shutdown Equipment for Any Single Fire

During the 2001 triennial fire protection inspection, the NRC identified an unresolved item concerning an issue that a single fire in some plant areas could potentially cause multiple fire induced spurious actuations of safe shutdown components to occur, as documented in Generic Letter 86-10. The Limerick Generating Station UFSAR and IPEEE were based on the assumption that only a single fire-induced spurious action could occur at a time. The potential of multiple fire-induced spurious actuations in a single fire and whether the accumulated effects of these spurious actuations should be addressed in the licensees' fire protection programs is a generic industry issue to be resolved between the NRC (NRR) and the nuclear industry. Any further corrective actions required to resolve this issue will be addressed in future guidance to be issued by the NRC. The licensee will be expected to identify and address any corrective actions following the issuance of the guidance, and those corrective actions will be reviewed in future triennial fire protection inspections. The licensee has captured this issue in their CAP (IR 00888803) to track issuance of NRC guidance regarding multiple spurious actuation assumptions. Therefore, this item is administratively closed.

4OA6 Meetings, Including Exit

Exit Meeting Summary

On April 10, 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 Section VI of the NRC Enforcement Policy, NUREG-1600, for disposition as non-cited violations (NCV).

- Technical Specification 6.8.1.g, "Procedures and Programs," requires that written procedures shall be established, implemented, and maintained covering fire protection program implementation. Contrary to this requirement, Exelon failed to establish an adequate remote shutdown procedure to align RCIC pump suction to the suppression pool as assumed and analyzed in the fire safe-shutdown analysis. Specifically, Exelon did not ensure that procedure SE-1. "Remote Shutdown," contained the proper steps to align the RCIC pump suction to the suppression pool while operating the system at the remote shutdown panel for a fire in the main control room or the cable spreading room. The issue was entered into Exelon's corrective action program as IR 843591. The finding was more than minor because it is associated with the procedural quality attribute of the Mitigating Systems Cornerstone and affects the cornerstone objective of

ensuring the availability and reliability of the RCIC system under postulated fire safe-shutdown conditions. The inspectors determined that the finding was of very low safety significance (Green), based on IMC 0609, Appendix F, "Fire Protection Significance Determination Process," Phase 2 screening, Task Number 2.3.5, because no credible fire ignition source scenarios were identified.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Exelon Generation Company
C. Mudrick, Site Vice President
E. Callan, Plant Manager
D. DiCello, Manager, Radiation Protection
R. Dickinson, Director, Engineering
P. Gardner, Director, Operations
R. Kreider, Manager, Regulatory Assurance
M. Jesse, Manager, Nuclear Oversight
S. Bobyock, Manager, Plant Engineering
D. Palena, Manager, Electrical Engineering Systems
E. Dennin, Shift Operations Superintendent
C. Gray, Manager, Radiological Engineering
R. Harding, Engineer, Regulatory Assurance
J. Berg, System Manager, HPCI
J. George, System Manager, RHR
M. Gift, System Manager, Radiation Monitoring Systems
L. Lail, System Manager, EDG
R. Gosby, Radiation Protection Technician, Instrumentation
D. Malinowski, Simulator Instructor
J. Sprucinski, Senior Radiation Protection Technician
R. Harding, Regulatory Assurance
J. Risteter, Radiation Protection Manager
D. Wahl, Environmental Scientist
C. Rich, Manager of Nuclear Training
J. Hunter, Operations Training Manager
D. Malinowski, Supervisor Requalification Training
W. Ward, Exam Developer
D. Monahan, Simulator Operator/Instructor
R. Harding, Licensing
J. Mihm, Instructor/Evaluator
S. Cohen, Instructor/Evaluator
C. Bruce, Fire Protection Engineer
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
M. Lyate, Radiation Protection Supervisor, Field Operations
T. Moore, Director Work management
J. Risteter, Radiation Protection Supervisor, Technical Support

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

2515/173	TI	Review of the Implementation of the Industry Ground Water Protection Voluntary Initiative (Section 4OA5.2)
05000352, 05000353/2001014-01	URI	Reliance on an Assumption of a Single Spurious Malfunction of Safe Shutdown Equipment for Any Single Fire (Section 4OA5.3)
05000352, 05000353/2008005-01	URI	Changes to Technical Specification 3.8.1 Bases (Section IR18.2)
05000353/2008-001-01	LER	Valid Actuation of the D23 Emergency Diesel Generator Bus Undervoltage Logic (Section 4OA3.2)
05000352/2008-003	LER	High Pressure Coolant Injection System Instrument Power Supply Failure (Section 4OA3.3)
05000352, 05000353/2008-004	LER	Remote Shutdown Procedure Error (Section 4OA3.4)

Opened and Closed

05000352, 353/2009002-01	NCV	Failure to Maintain Design Control for Reactor Building Temperatures (Section 1R22)
05000352, 353/2009002-02	NCV	Failure to Failure to Obtain License Amendment for TS Bases Change (Section 1R1.8)

Discussed

None

LIST OF DOCUMENTS REVIEWED

Section 1R04: Equipment Alignment

Procedures
1592.1N (OL-4), Equipment Alignment for D14 Diesel Generator Operation, Revision 24
1S57.1.A(COL), Equipment Alignment for Automatic Operation of HPCI System, Revision 15

S51.8.B, Shutdown Cooling-Reactor Coolant Circulation Operation Startup and Shutdown, Revision 66

Section 1R05: Fire Protection

Procedures
F-D-311D, D14 Diesel Generator Room and Fuel Oil and Lube Oil Tank Rooms; 311D and 312D, Elevation 217, Fire Area 82, Revision 5
F-R-370, Unit 2 Safeguard System Access Area Room 370, Elevation 217, Fire Area 67, Revision 7

Section 1R07: Heat Sink Performance

Procedures
RT-1-012-390-0, RHR Heat Exchange Heat Transfer Performance Computation Test, Revision 8
RT-2-012-391-2. Unit 2 'B' RHR Heat Exchanger Transfer Test, Revision 6

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Procedures
WC-AA-104, Review and Screening for Production Atmosphere/Environmental Risk, Revision 14
WC-LG-104-1001, Guidelines for the Review, Screening and Execution of Production Risk Activities, Revision 2
WC-AA-101, On-line Work Control Process, Revision 15
S43.7.A, Manual Operation of Scoop Tube Positioners, Revision 32
S43.D.A, Resetting A Scoop Tube Lock-up, Revision 18

Section 1R15: Operability Evaluations

Procedures
ST-6-107-760-2, Volt 2 Control Rod exercise Test, Revision 42

Drawings
Drawing E-0476 Electrician Schematic Diagram, Drywell Area Unit Coolers, Revision 22

Section 1R18: Plant Modifications

Procedures
S53.0.A, Normal Makeup/Response to Low Level in Fuel Storage Pool or Reactor Well, Revision 22
UFSAR Section 9.1.3.5, Instrumentation Applications

Section 1R20: Refueling and Other Outage Activities

Procedures
NF-AA-330-1001, Core Verification Guideline, Revision 4
GP-3, Normal Plant Shutdown, Revision 127
Limerick 2R10, Shutdown Safety Plan, 3/6/2009
OU-LG-104, Limerick Shutdown Safety Management Program, Revision 7

OU-AA-103, Shutdown Safety Management Program, Revision 8
2R10 Decay Heat Addendum
2GP-6.1, Refueling (OPCON 5) System Preparation, Revision 20
S53.3.B, Filling Reactor Well and Dryer/Separator Storage Pool from Condensate System, Revision 13

Section 1EP2: Alert and Notification System (ANS) Evaluation

EP-AA-1000, Exelon Nuclear Standardized Radiological Emergency Plan, Revision 19
EP-AA-1008, Radiological Emergency Plan Annex for Limerick Generating Station, Revision 15
RT-7-EPP-300-0, Public Notification System (Siren) Test
EP-MA-121-1002, Exelon East Alert Notification System (ANS) Program, Revision 5
EP-MA-121-1004, Exelon East ANS Corrective Maintenance, Revision 4
EP-MA-121-1005, Exelon East ANS Preventive Maintenance, Revision 5
Sample of maintenance records for 2007, 2008, and 2009

Section 1EP3: Emergency Response Organization Staffing and Augmentation System

EP-AA-1000, Exelon Nuclear Standardized Radiological Emergency Plan, Revision 19
EP-AA-1008, Radiological Emergency Plan Annex for Limerick Generating Station, Revision 15
EP-AA-112, Emergency Response Organization (ERO)/Emergency Response Facility (ERF) Activation and Operation, Revision 13
EP-AA-112-100, Control Room Operation, Revision 9
EP-AA-112-100-F-07, Mid-Atlantic ERO Notification or Augmentation, Revision E
EP-AA-112-200, Technical Support Center Activation and Operation, Revision 7
EP-AA-112-300, Operations Support Center Activation and Operation, Revision 6
OP-LG-101-111, Shift Staffing Requirements, Revision 2
TQ-AA-113, ERO Training and Qualification, Revision 12

Section 1EP4: Emergency Action Level (EAL) and Emergency Plan Changes

EP-AA-1000, Exelon Nuclear Standardized Radiological Emergency Plan, Revision 19
EP-AA-1008, Radiological Emergency Plan Annex for Limerick Generating Station, Revisions. 14 and 15
EPA-AA-120-1001, 50.54(q) Program Evaluation and Effectiveness Review, Attachment 1, Revision 4
EPA-AA-120, Emergency Plan Administration, Revision 9
EP-AA-120-1001, 10 CFR 50.54(q) Change Evaluation, Revision 5
10 CFR 50.54(q) screenings and reviews, dated between August 2008 and March 2009

Section 1EP5: Correction of Emergency Preparedness Weaknesses

Audit NOSA-LIM-08-03, Emergency Preparedness Audit Report, Limerick, April 28 – May 2, 2008
Audit NOSA-NCS-08-03, Emergency Preparedness Audit Report, Cantera and Kennett Square, March 31 – April 4, 2008
NOS LGS Emergency Preparedness Comprehensive Performance Assessment, dated September 19, 2008
Focused Area Self-Assessment, Readiness Assessment for the INPO Review Visit, ASSA#636075-32
Focused Area Self-Assessment, NRC Baseline Inspection Readiness Assessment,

ASSA#840707-03
Emergency Preparedness Drill Reports, dated between January 2008 and March 2009
Emergency Preparedness-related Issue Reports and Action Requests, dated between January 2008 and March 2009

Section 20S1, 20S2, 20S3: Radiation Safety

Procedures:
RP-AA-203, Revision 3, Exposure Control and Authorization
RP-AA-210, Revision 11, Dosimetry Issue, Usage, and Control
RP-AA-220, Revision 5, Bioassay Program
RP-LG-220-1001, Revision 5, Perform Calibration Checks and Whole Body Count on AccuScan
RP-LG-220-1002, Revision 3, Perform Calibration Checks and Whole Body Count on FastScan
RP-LG-225, Revision 1, Calibration of Canberra AccuScan and FastScan Whole Body Counters
RP-AA-222, Revision 3, Methods for Estimating Internal Exposure from In Vivo and In Vitro Bioassay Data
RP-AA-250, Revision 4, External Dose Assessments From Contamination
RP-LG-300-102, Revision 2, Removing Items from the Spent Fuel Pool, Reactor Cavity, Equipment Pit, or Cask Pit
RP-AA-301, Revision 2, Radiological Air Sampling Program
RP-AA-350, Revision 7, Personnel Contamination Monitoring, Decontamination, and Reporting
RP-AA-376, Revision 2, Radiological Postings, Labeling, and Markings
RP-AA-400, Revision 5. ALARA Program
RP-LG-400-1003, Revision 2, Emergent Dose Control and Authorization
RP-AA-401, Revision 9, Operational ALARA Planning and Controls
RP-AA-403, Revision 1, Administration of the Radiation Work Permit Program
RP-AA-460, Revision 13, Controls for High and Very High Radiation Areas
RP-LG-460-1016, Revision 6,Radiation Protection Controlled Keys
RT-0-100-460-0, Revision 3,High Radiation and Locked High Radiation Door Preventative Maintenance Inspection

Issue Reports (Access Control/ALARA related (71121.01/02):)
865581, 845162, 740616, 764772, 753194, 786036, 753069, 753254, 764072, 764070, 764064, 764051, 764040. 764035, 764024, 764020, 864642, 856932, 839478, 863398, 790161

Cause Analyses:
Apparent Cause Report (IR 790161), Improving Fleet Dose Projections
Common Cause Analysis (IR 748277), Personnel Contamination Events during 1R12
Common Cause Analysis (IR748276), Floor Drains backup causing contamination
Common Cause Analysis (IR 764772), Emergent Radiation Dose Issues

ALARA Plans:
AP 2009-012, Drywell RPV Nozzle and Skirt ISI and associated work

ALARA Work-In-Progress/Post-Job Reviews:
AP08-005, Unit 1 A & B Loop ESW Pipe Replacement
AP08-038, Fuel Floor Reassembly during 1R12
AP08-036, Reactor Disassembly
AP08-011, Drywell ISI RPV Nozzle & Skirt
AP08-009, Installation/Removal of Scaffolding
AP08-037, Reactor Cavity Work Platform Activities

Station ALARA Council Meeting Minutes
Meeting Nos.:2008-01 through 2008-23

Nuclear Oversight Objective Evidence Reports
Comprehensive Performance Assessment, LG-08-13, regarding High Radiation Area Controls, Contamination Controls, Management Oversight of Radworker Performance, and On-Line Dose Control
NOSPA-LG-08-3T, HCU maintenance
NOSPA-LG-08-1Q, Control of Radioactive Sources

Miscellaneous Reports
Dose and Dose Rate Alarm Report for period May 2008 through January 12, 2009
Business Plan Performance Report November 2008
2008 Calibration Records for the Canberra FastScan and AccuScan Whole Body Counting Systems
Training Materials for using the Eberline ASP-2E and RM-25, the Merin Gerin RAM GAM, and Bicron RSO-50E.
1R!2 Radiation Protection Outage Report

Section 2PS3: Radiological Environmental Monitoring Program and Radioactive Material Control Program

Procedures:
RP-AA-228, Rev 0, 10 CFR 50.75(g) and 10 CFR 72.30(D) Documentation Requirements
RP-AA-503, Rev 1, Unconditional Release Survey Method
RP-LG-700-1001, Rev 2, Radiation Protection Instrumentation Operations Guidelines
RP-LG-720, Rev 1, Calibration of on NE Technology Model SAM-9, Small Article Monitor
RP-LG-741, Rev 1, Instrument Quality Checks
CY-AA-170-000, Rev 3, Radioactive Effluent and Environmental Monitoring Programs
CY-AA-170-100, Rev 2, Radiological Environmental Monitoring Program
CY-AA-170-200, Rev 1, Radioactive Effluents Controls Program
CY-AA-170-210, Rev 0, Potentially Contaminated System Controls Program
CY-AA-170-1000, Rev 2, Radiological Environmental Monitoring Program and Meteorological Program Implementation
CY-AA-170-1100, Rev 0, Quality Assurance for Radiological Monitoring Programs
CY-LG-170-301, Rev 24, Offsite Dose Calculation Manual
CY-LG-120-11012, Rev 19, Outside Chemistry/NPDES Sampling & Analysis Schedule
RT-5-104-800-0, Rev 6, Tritium Analysis of Non-Contaminated Systems
CY-AA-170-400, Rev 1, Radiological Groundwater Protection Program
CY-AA-170-415, Rev 2, Controlled RGPP Sample Point Data and Standard Control Limits
CY-AA-170-0100, Rev 1, Personnel Familiarization Guide to REMP, MET. RGPP, and REC programs
CY-AA-171-4000, Rev 3, Radiological Groundwater Protection Program Implementation
CY-AA-170-4100, Rev 1, Radiological Ground water Protection Program Environmental Sample Collection and Implementation
CY-AA-170-4200, Rev 1, RGPP Data Analysis and Annual Report Preparation
CY-AA-170-4400, Rev 1, Groundwater Well and Surface Sample Point Selection Criteria
CY-LG-170-4160, Rev 1, Radioactive Groundwater Protection Program Scheduling and Notification for the Limerick Generating Station
LS-AA-1120, Rev 10, Reportable Event RAD 1.34
*ER – 5, Rev 12, Collection of Water Samples for Radiological Analysis

*ER - 8, Rev 12, Collection of Air Particulate and Air Iodine Samples for Radiological Analysis
*ER – 9, Rev 7, Collection of TLD Samples for Radiological Analysis
*ER-10, Rev 11, Collection of Milk Samples for Radioactive Analysis

*Normandeau Associates, Inc. Procedures

Sampling Sites:
Cow's Milk Nos. 10F4, 18E1, 19B1, 23F1, 25C1
Air Particulate/Iodine: 10S3, 11S1, 11S2, 13C1, 14S1,22G1
Drinking Water: Nos. 15F4, 15F7, 16C2, 28F3
Surface Water Nos. 13B1, 24S1
Thermolumeniscent Dosimeters Nos. 10S3, 11S1, 14S1, 21S2, 23S2, 19D1

Nuclear Oversight (NO)/Self-Assessment Reports:
NOSCPA-LG-08-13, Contamination Controls Assessment
Self-Assessment 567519, Tritium Monitoring-Radiological Groundwater Protection Plan Implementation
Chemistry REMP Self Assessment 859249-02

Issue Reports:
880363, 889095, 882759, 848385, 801327, 700944, 739108, 798054, 752414, 842009, 881821, 880716, 567519, 864773, 808357, 802070, 773982, 680121, 654269, 625154, 591087, 615724

Calibration Records
SAM Nos. 334213, 334829, 332533, 334219, 334212, 334828, 334827

Miscellaneous Reports:
- 2007 Annual Radioactive Effluent Release Report, No. 33
- 2007 Annual Radiological Environmental Operating Report, No. 23
- Evaluation of the LGS Onsite Radioactive Materials Storage Area: A vendor prepared decommissioningCost Estimate Report
- Air Particulate Monitoring System Maintenance Records (Normandeau Associates, Inc)
- Water Sampling Equipment Maintenance Logs
- Hydro-geologic Investigation Report, No. 045136
- 2008 Land Use Survey
- Analytics Inter-laboratory Cross Check Program Results, January – September 2008
- Fall 2008 Routine Groundwater and Surface Water Monitoring Program Results
- P1009 Meteorological Monitoring Program, Equipment Servicing and Data Recovery Manual, Rev 26
- Monthly Report on the Meteorological Monitoring Program, December 2008

Section 4OA1: Performance Indicator (PI) Verification

Procedures
LS-AA-2001, Collecting and Reporting of NRC Performance Indicator Data, Revision 12
LS-AA-2110, Monthly Data Elements for NRC Emergency Response Organization (ERO) Drill Participation, Revision 6
LS-AA-2120, Monthly Data Elements for NRC Drill/Exercise Performance, Revision 4
LS-AA-2130, Monthly Data Elements for NRC Alert and Notification System (ANS) Reliability, Revision 5
Data records for the three EP performance indicators, July 2008 – December 2008

Issue Reports and Action Requests
IR 893237010, Review IR 840421 for HPCI System Availability

Section 4OA2: Problem Identification and Resolution

Procedures
LS-AA-125, Corrective Action Program (CAP) Procedure, Revision 12
LS-AA-125-1003, Apparent Cause Evaluation Manual, Revision 8
SE-1, Remote Shutdown, Revision 60
SE-1, Remote Shutdown, Revision 61
S49.1.C, Recovery from RCIC Trip, Revision 14

P&IDs
8031-M-49, U1 Reactor Core Isolation Cooling, Revision 53
8031-M-49, U1 Reactor Core Isolation Cooling, Revision 48
8031-M-50, U1 & U2 RCIC Pump Turbine, Sheets 1 - 4
8031-M-55, U2 High Pressure Coolant Injection, Revision 55
8031-M-55, U2 High Pressure Coolant Injection, Revision 51

Drawings
M-1-E51-1040-E-001, U1 Elementary Diagram Reactor Core Isolation Cooling, Revision 16
M-1-E51-1040-E-003, U1 Elementary Diagram Reactor Core Isolation Cooling, Revision 30
M-1-E51-1040-E-008, U1 Elementary Diagram Reactor Core Isolation Cooling, Revision 26
M-1-E51-1040-E-012, U1 Elementary Diagram Reactor Core Isolation Cooling, Revision 26
M-1-E51-1040-E-017, U1 Elementary Diagram Reactor Core Isolation Cooling, Revision 7
M-1-E51-1040-E-019, U2 Elementary Diagram Reactor Core Isolation Cooling, Revision 26
M-1-E51-1040-E-020, U2 Elementary Diagram Reactor Core Isolation Cooling, Revision 10
M-1-E51-1040-E-021, U2 Elementary Diagram Reactor Core Isolation Cooling, Revision 0
M-1-E51-1040-E-027, U2 Elementary Diagram Reactor Core Isolation Cooling, Revision 5
M-1-E51-1040-E-033, U2 Elementary Diagram Reactor Core Isolation Cooling, Revision 11

Action Request
A1351836

Issue Reports
00843591
00859194
00855503

Apparent Cause Evaluations
00843591, SE-1 Does Not Adequately Address RCIC Suction Alignments
00859194, NOS ID Potential Areas for Improvement FP.1-1 Fire Protection Program Issues

Miscellaneous
LER 2008-004, Remote Shutdown Procedure Error
Limerick Generating Station, Technical Specifications
Limerick Generating Station, Updated Final Safety Analysis Evaluation Report
T-112 Bases, Emergency Blowdown, Revision 9

LIST OF ACRONYMS

ADAMS	Agencywide Documents Access Management System
ALARA	as low as reasonably achievable
ANS	alert and notification system
CAP	Corrective Action Program
CFR	Code of Federal Regulations
CRD	control rod drive
CST	condensate storage tank
DEP	drill and exercise performance
EAL	emergency action level
ECR	engineering change request
EDG	emergency diesel generator
EP	emergency preparedness
ERO	emergency response organization
HCU	hydraulic control unit
HPCI	high pressure coolant injection
HRA	high radiation areas
IMC	Inspection Manual Chapter
IPEEE	individual plant examination for external events
IP	inspection procedure
IR	issue report
LER	licensee event report
LHRA	locked high radiation area
NCV	non-cited violation
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission
NRR	Nuclear Reactor Regulation
ODCM	offsite dose calculation manual
OPCON	operational condition
OOS	out of service
P&ID	piping and instrumentation drawing
PARS	Publicly Available Records
PI	performance indicator
RCA	radiologically controlled area
RCIC	reactor core isolation cooling
RCWP	reactor cavity work platform
REPM	radiological environmental monitoring program
RHR	residual heat removal
RHRSW	residual heat removal service water
RTP	rated thermal power
RWCU	reactor water cleanup
RWP	radiation work permit
SDP	significance determination process
SR	surveillance requirement
SSC	structure, system, component
ST	surveillance test
TEDE	total effective dose equivalent

TI	temporary instruction
TS	technical specification
UFSAR	updated final safety analysis report
URI	unresolved item
VHRA	very high radiation area