November 4, 2002

Mr. John Skolds
President and CNO
Exelon Nuclear
Exelon Generation Company, LLC
4300 Winfield Road
5th Floor
Warrenville, IL 60555

SUBJECT: LIMERICK GENERATING STATION - NRC INTEGRATED INSPECTION REPORT 50-352/02-05, 50-353/02-05

Dear Mr. Skolds:

On September 28, 2002, the NRC completed an inspection at your Limerick Generating Station Units 1 and 2. The enclosed report documents the inspection findings which were discussed on October 4, 2002, with Mr. W. Levis and other members of your staff.

This 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 procedures and records, observed activities, and interviewed personnel.

Based on the results of this inspection, the inspectors identified four issues of very low safety significance (Green). Two of these issues were determined to involve violations of NRC requirements. However, because of their very low safety significance and because they have been entered into your corrective action program, the NRC is treating these issues as Non-Cited Violations, in accordance with Section VI.A.1 of the NRC's Enforcement Policy. If you deny these non-cited violations, you should provide a response with the basis for your denial, within 30 days of the date of this inspection report, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Region I; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, D.C. 20555-0001; and the NRC Resident Inspector at the Limerick facility.

The NRC has increased security requirements at the Limerick Generating Station in response to terrorist acts on September 11, 2001. Although the NRC is not aware of any specific threat against nuclear facilities, the NRC issued an Order and several threat advisories to commercial power reactors to strengthen licensees' capabilities and readiness to respond to a potential attack. The NRC continues to monitor overall security controls and verify by inspection the licensee's compliance with the Order and current security regulations.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of the NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (The Public Electronic Reading Room).

Sincerely,

/RA/

Mohamed Shanbaky, Chief
Projects Branch 4
Division of Reactor Projects

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

Enclosure: Inspection Report 50-352/02-05, 50-353/02-05

Attachment 1: Supplemental Information

cc w/encl: Senior Vice President, Mid-Atlantic Regional Operating Group
President and CNO, Exelon Nuclear
Senior Vice President - Nuclear Services
Vice President - Mid-Atlantic Operations Support
Chairman, Nuclear Safety Review Board
Director - Licensing, Mid-Atlantic Regional Operating Group
Vice President - Licensing and Regulatory Affairs
Site Vice President - Limerick Generating Station
Plant Manager, Limerick Generating Station
Regulatory Assurance Manager - Limerick
D. Allard, Director, Pennsylvania Bureau of Radiation Protection
R. Janati, Chief, Division of Nuclear Safety, Pennsylvania Bureau of Radiation Protection
Secretary, Nuclear Committee of the Board
Vice President, General Counsel and Secretary
Correspondence Control Desk
J. Johnsrud, National Energy Committee
Chairman, Board of Supervisors of Limerick Township
Manager, Licensing - Limerick and Peach Bottom

Distribution w/encl: H. Miller, RA/J. Wiggins, DRA
M. Shanbaky, DRP
D. Florek, DRP
S. Iyer, DRP
A. Burritt, DRP - Senior Resident Inspector
H. Nieh, RI EDO Coordinator
S. Richards, NRR (ridsnrrdlpmlpdi)
S. Wall, PM, NRR
J. Boska, PM, NRR
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NAME	ABurritt/DF for (via e-mail)		DFlorek/DF		MShanbaky/MS	
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U.S. NUCLEAR REGULATORY COMMISSION

REGION 1

Docket Nos:	50-352; 50-353
License Nos:	NPF-39, NPF-85
Report No:	50-352/02-05, 50-353/02-05
Licensee:	Exelon Generation Company, LLC
Facility:	Limerick Generating Station, Units 1 & 2
Location:	Evergreen and Sanatoga Roads Sanatoga, PA 19464
Dates:	July 1, 2002 through September 28, 2002
Inspectors:	A. Burritt, Senior Resident Inspector B. Welling, Resident Inspector J. Noggle, Sr. Health Physicist G. Smith, Sr. Physical Security Inspector P. Frechette, Physical Security Inspector E. Gray, Sr. Reactor Inspector J. Benjamin, Reactor Inspector F. Jaxheimer, Reactor Inspector R. Keefer, Reactor Inspector K. Young, Reactor Inspector J. Jang, Sr. Health Physicist S. Chaudhary, Sr. Reactor Inspector
Approved by:	Mohamed Shanbaky, Chief Projects Branch 4 Division of Reactor Projects

SUMMARY OF FINDINGS

IR 05000352-02-05, IR 05000353-02-05; Exelon Generation Company; on 07/01-09/28/2002; Limerick Generating Station, Units 1 and 2; Maintenance Effectiveness, Personnel Performance During Non-routine Plant Evolutions, Permanent Plant Modifications, and Post Maintenance Testing.

This inspection was conducted by resident inspectors, regional health physicists, regional security inspectors, and regional reactor inspectors. The inspection identified four Green findings, two of which were non-cited violations. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter 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. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. Inspector Identified Findings

Cornerstone: Initiating Events

- **Green.** The inspectors identified a non-cited violation of Technical Specification 6.8.1, "Procedures," because operators failed to follow procedures while placing a reactor feed pump in service, which led to a significant reactor level transient. This finding involved a human performance error because control room operators performed procedural steps out of sequence during a non-routine feed pump evolution.

  This finding was determined to have very low safety significance by the Reactor Inspection Findings for At-Power Situations Significance Determination Process because it did not contribute to the likelihood of a loss of coolant accident initiator, the unavailability of mitigation equipment, or fire and flooding events. (Section 1R14)

- **Green.** The inspectors identified a non-cited violation of 10 CFR 50.59, because Exelon staff did not analyze the effect of the increased condensate temperature on all components potentially impacted. Exelon engineering and chemistry personnel did not correctly follow procedures when conducting a 10 CFR 50.59 screening for a change to Procedure GP-5, "Steady State Operations." Consequently, Exelon did not perform a safety evaluation when required. The procedure change contributed to an unplanned reactor shutdown due to degrading condenser vacuum on July 23, 2002. This finding involved a human performance error because engineering and chemistry personnel did not correctly evaluate whether the proposed change affected the Safety Analysis Report.

  This finding was determined to have very low safety significance by the Reactor Inspection Findings for At-Power Situations Significance Determination Process, because although the finding contributed to an unplanned reactor shutdown, it did not affect the availability of mitigation equipment, it did not contribute to the likelihood of a loss of coolant accident initiator, and it did not contribute to the likelihood of a fire or flood event. (Section 1R17)

Cornerstone: Mitigating Systems

- **Green.** The inspectors identified a finding of very low safety significance, because Exelon maintenance technicians did not follow maintenance procedures and improperly assembled the Unit 1 "A" reactor feed pump discharge valve breaker during preventive maintenance activities. Consequently, the breaker did not properly respond and its associated feed pump discharge valve could not be closed when demanded by control room operators during post-scram feedwater system manipulations. This complicated the operators' ability to control the reactor level while performing post-scram emergency operating procedures. This finding involved a human performance error because maintenance technicians did not assemble the breaker in the manner specified by the maintenance procedure.

  This finding was determined to be of very low safety significance by the Reactor Inspection Findings for At-Power Situations Significance Determination Process because it did not result in an actual loss of safety function of a non-Technical Specification Train of equipment for greater than 24 hours, and it did not screen as risk significant due to a seismic, fire, flooding, or severe weather initiating event. (Section 1R12)

- **Green.** The inspectors identified a finding of very low safety significance, because Exelon maintenance personnel did not follow the work order for conducting preventive maintenance on the feedwater control system. Consequently, a wire that was disconnected during the activity was improperly restored, which disabled the setpoint setdown function of the feedwater control system. The wiring error led to a post-scram high reactor level and a trip of the reactor feed pumps, which caused the loss of the power conversion system function following the scram. This finding involved a human performance error by the maintenance technician because he did not restore the setpoint setdown function to service in a manner specified by the maintenance work order.

  This finding was determined to have very low safety significance using a Phase 3 analysis. (Section 1R19)

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Report Details

Summary of Plant Status

Unit 1 began this inspection period operating at 100% power and remained at or near that power level except for brief periods of planned testing and control rod pattern adjustments.

Unit 2 began this inspection period operating at 100% power. On July 23, 2002, operators performed a rapid plant shutdown due to decreasing main condenser vacuum. The Unit 2 reactor was taken critical on July 26 and was returned to 100% power on July 28. Unit 2 remained at or near that power level for the remainder of the inspection period except for brief periods of planned testing and control rod pattern adjustments.

1. REACTOR SAFETY [Reactor - R]
Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R01 Adverse Weather Protection (71111.01)

a. Inspection Scope

During a period of hot weather in August 2002, the inspectors reviewed the impact of outside temperatures on condensate temperature and condenser vacuum on both units. This inspection followed an event in July in which high condensate temperature led to rapid plant shutdown. That event is described in Section 1R14 of this report.

The inspectors reviewed operator logs, condenser vacuum readings, and condensate temperature data. The inspectors also referred to general operating procedure GP-5, “Steady State Operations.”

b. Findings

No findings of significance were identified.

1R02 Evaluation of Changes, Tests, or Experiments (71111.02)

a. Inspection Scope

The inspectors reviewed selected samples of safety evaluations for the initiating events, barrier integrity, and mitigating systems cornerstones to verify that Exelon had appropriately considered the conditions under which changes to the facility or procedures may be made, or tests conducted, without requiring prior NRC approval. The inspectors reviewed safety evaluations for both design packages and procedure changes. The inspectors assessed by discussions with plant staff and review of additional information, such as calculations, supporting analyses, regulatory references, and plant drawings, whether Exelon has appropriately concluded that the changes could be accomplished without obtaining a license amendment. In addition, the inspectors reviewed the administrative procedure that was used to control the screening, preparation, and issuance of the safety evaluations to ensure that the procedure adequately covered the requirements of 10 CFR 50.59.

The inspectors also reviewed samples of design/engineering packages and procedure

changes for which Exelon had determined that 50.59 evaluations were not required, and verified that Exelon's conclusions to screen out these changes from performing a full 50.59 safety evaluation were correct and consistent with 10 CFR 50.59.

The inspectors reviewed a sample of condition reports documenting problems with the safety evaluation process and identified by Exelon in their corrective action program.

The safety evaluations and screenings were selected based on the safety significance of the changes and the risk to structures, systems and components (SSCs). A listing of the safety evaluations, safety evaluation screens, and other documents reviewed is provided in Attachment 1.

b. Findings

No findings of significance were identified other than as described in Section 1R17 of this report.

1R04 Equipment Alignment (71111.04)

.1 Walkdowns

a. Inspection Scope

The inspectors performed partial system walk-downs to verify system and component alignment and to note any discrepancies that would impact system operability. The inspectors verified selected portions of redundant or backup system or trains were available while certain system components were out of service. The inspectors reviewed selected valve positions, general condition of major system components, and electrical power availability. The partial walk-down included the following systems:

- Unit 1 "B" core spray loop, with Unit 1 "A" core spray loop out of service
- Unit 2 "B" core spray loop, with Unit 2 "A" core spray loop out of service for planned maintenance

The inspectors used Piping and Instrumentation Diagram 8031-M-52, "Core Spray."

b. Findings

No findings of significance were identified.

.2 Complete Risk Important System Walkdowns

a. Inspection Scope

The inspector performed a complete system walkdown on the Unit 2 standby liquid control system to verify whether the equipment was properly aligned. In addition the inspector reviewed the most recent surveillance test data, maintenance activities, and issues tracked by the system manager, which included condition reports and action requests. These reviews were conducted to verify discrepancies that would impact system operability. The following documents were included in the review:

- FSAR Section 9.3.5, “Standby Liquid Control System”
- Piping and Instrumentation Diagram 8031-M-48, “Standby Liquid Control”
- Procedure 2S48.1.A (COL), “Equipment Alignment to Place Standby Liquid Control System in Normal Standby Condition”

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05)

a. Inspection Scope

The inspectors toured high risk areas at Limerick to assess Exelon’s control of transient combustible material and ignition sources, fire detection and suppression capabilities, fire barriers, and any related compensatory measures. The inspectors reviewed the respective pre-fire action plan procedures and Section 9A of the Updated Final Safety Analysis Report (UFSAR). The following fire areas were inspected:

- Unit 1 Reactor enclosure cooling water equipment area (fire area 41)
- Unit 1 Reactor Safeguard system access area (fire area 42)
- Control structure enclosure lower levels (fire area 1)
- Unit 1 Core Spray Compartment Pump Room “C” (fire area 36)
- Unit 1 "B” and “A” Class 1E Battery Rooms (fire areas 8 and 9)

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures (71111.06)

a. Inspection Scope

The inspectors reviewed Unit 2 internal emergency core cooling system flood protection equipment and mitigation plans. The inspectors walked down selected rooms, inspected flood protection features, and reviewed procedures. The following documents were included in the review:

- UFSAR Section 3.4, “Water Level (Flood) Design”
- SE-4, Revision 5, “Flood”
- SE-4-1, Revision 4, “Reactor Enclosure Flooding”
- Alarm Response Card (ARC) ARC-MCR-217A5, “HPCI Pump Room Flood”
- ARC-MCR-215A3, “2B/2D Core Spray Pump Room Flood”
- ARC-MCR-215G5, “2B/2D Residual Heat Removal (RHR) Pump Room Flood”
- ARC-MCR-213A3, ”2A/2C Core Spray Pump Room Flood”
- ARC-MCR-213G5, “2A/2C RHR Pump Room Flood”

b. Findings

No findings of significance were identified.

1R07 Heat Sink Performance (71111.07)

a. Inspection Scope

The inspectors observed heat exchanger performance testing for the 1C residual heat removal (RHR) pump motor oil cooler per Exelon Procedure RT-2-011-398-1. The inspectors reviewed documentation for potential deficiencies which could mask degraded performance and common cause performance problems. The inspector also reviewed previous maintenance and testing records associated with the 1C RHR motor oil cooler to assess whether Exelon was meeting their commitments to Generic Letter 89-13, "Service Water System Problems Affecting Safety-Related Equipment."

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification (71111.11)

.1 Requalification Activities Review by Resident Staff

a. Inspection Scope

On September 17, 2002, the inspector observed an operating crew "as found" simulator exam to assess licensed operator performance and the evaluator's critique. The inspector also referred to the simulator scenario document, LSES-2006, and the following off-normal plant procedures and emergency operating procedures:

- T-101, Reactor Pressure Vessel Control
- T-102, Primary Containment Control
- T-112, Emergency Blowdown
- GP-4, Rapid Plant Shutdown

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12)

.1 Unit 1"A" Reactor Feed Pump Discharge Valve Breaker

a. Inspection Scope

The inspectors reviewed the effectiveness of maintenance associated with the failure of the Unit 1 "A" reactor feed pump discharge valve to shut following a Unit 1 scram on May 19, 2002. The inspectors discussed the issue with operations and maintenance personnel and reviewed the following documents:

- Operator log entries for May 19, 2002
- Maintenance Procedure M-093-004
- Maintenance Work Order R0875915
- Condition Report 108972
- System Operating Procedure S06.1.D, "Post Scram Level Control."

b. Findings

Introduction

The inspectors identified a finding of very low safety significance (Green), because Exelon maintenance technicians did not follow maintenance procedures and improperly assembled the Unit 1 "A" reactor feed pump discharge valve breaker during preventive maintenance activities. Consequently, the breaker did not properly respond and its associated feed pump discharge valve could not be closed when demanded by control room operators during post-scram feedwater system manipulations. This complicated the operators' ability to control the reactor level while performing post-scram emergency operating procedures.

Description

On May 19, 2002, following a Unit 1 turbine trip and reactor scram, the operators were unable to shut the Unit 1 "A" reactor feed pump discharge valve from the control room, as specified by Procedure S06.1.D, "Post Scram Level Control." This condition delayed the operators' ability to establish stable reactor level control per this procedure for about 25 minutes, until equipment operators were able to shut the valve locally.

The maintenance technicians who performed preventive maintenance on the feed pump discharge valve breaker on March 12, 2002, installed the armature in the breaker close contactor upside down, due to a failure to follow maintenance procedure M-093-004, "480V MCC Breaker Assembly and Cubicle Terminal Maintenance." The technicians did not properly perform section 5.3 of this procedure, which includes steps to check contact continuity and resistance and would have revealed the incorrect installation. Additionally, inspectors noted that the post-maintenance testing procedure did not ensure that the valve was cycled in both the open and close directions. Therefore, station personnel did not detect the maintenance error during post-maintenance testing.

Analysis

The failure of the maintenance technicians to properly assemble the Unit 1 "A" reactor feed pump discharge valve breaker is a performance deficiency, since this condition resulted from maintenance personnel not following a preventive maintenance procedure. Traditional enforcement does not apply, because the issue did not have any actual safety consequences or potential for impacting the NRC's regulatory function and was not the result of any willful violation of NRC requirements or Exelon procedures. The finding was considered more than minor, in that the issue was associated with the Equipment Performance (reliability) attribute of the Mitigating Systems cornerstone, and it affected the cornerstone objective. The Mitigating System cornerstone objective was affected because the improper assembly of the breaker resulted in failure of the associated valve to shut, upon demand from the control room, which impacted the reliability of the feedwater system, an element of the power conversion system and a mitigating system, following a reactor scram. This finding was determined to be of very low safety significance (Green) by Phase 1 of the Reactor Inspection Findings for At-Power Situations Significance Determination Process because it did not result in an actual loss of safety function of a non-Technical Specification Train of equipment for greater than 24 hours, and it did not screen as risk significant due to a seismic, fire, flooding, or severe weather initiating event.

The inspectors identified that this finding involved a human performance error because maintenance technicians did not assemble the breaker in the manner specified by the maintenance procedure.

Enforcement

The inspectors concluded that the maintenance performance deficiency discussed above did not constitute a violation of regulatory requirements because the maintenance activities were not on safety related components. Additionally, the inspectors identified no violations of 10 CFR 50.65, Maintenance Rule, related to these activities. This issue is documented in Exelon's corrective action program as Condition Report (CR) 108972. **(FIN 50-352/02-05-01)**

.2 Maintenance Effectiveness Biennial Inspection

a. Inspection Scope

The inspector reviewed the periodic evaluations required by 10 CFR 50.65 (a)(3) for Limerick Generating Station, Units 1 & 2, to verify that structures, systems and components (SSCs) within the scope of the maintenance rule were included in the evaluations, and balancing of reliability and unavailability was given adequate consideration. The inspectors reviewed Exelon's most recent periodic evaluation reports. The last periodic report covered, for Unit 1 the period from March 1, 2000, through February 28, 2002, and for Unit 2 the period from March 1, 1999, through February 28, 2001.

The inspector selected the five safety significant systems that were in (a)(1) status to verify that: (1) goals and performance criteria were appropriate, (2) industry operating experience was considered, (3) corrective action plans were effective, and (4) performance was being effectively monitored. The inspectors also reviewed Exelon's assessment of the balance between reliability and availability for these systems.

- Main Steam Supply Header (MSS01)
- Nuclear Boiler Safety Relief Valves (system 41A)
- Toxic Gas Analyzers (system 78G)
- Control Enclosure Chilled Water (system 90)
- Love Controllers (system 101)

The inspector reviewed the following (a)(2) high safety significant systems to verify that performance was acceptable.

- Control Building Emergency Fresh Air System (system 78B)
- Emergency Diesel Generators (system 92A)
- Substations and Main Transformers (system 35)

a. Findings

No findings of significance were identified.

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

a. Inspection Scope

The inspectors reviewed the assessment and management of selected maintenance activities to evaluate the effectiveness of Exelon's risk management for planned and emergent work. The inspectors compared the risk assessments and risk management actions to the requirements of 10 CFR 50.65(a)(4) and the recommendations of NUMARC 93-01, Section 11, "Assessment of Risk Resulting from Performance of Maintenance Activities." The inspectors evaluated the selected activities to determine whether risk assessments were performed when required and appropriate risk management actions were identified.

The inspectors reviewed scheduled and emergent work activities with work management personnel to verify whether risk management action threshold levels were correctly identified. The inspectors assessed those activities to evaluate whether appropriate implementation of risk management actions were performed in accordance with Exelon's procedures.

The inspectors compared the assessed risk configuration to the actual plant conditions and any in-progress evolutions or external events to evaluate whether the assessment was accurate, complete, and appropriate for the issue. The inspectors performed control room and field walk-downs to verify whether the compensatory measures identified by the risk assessments were appropriately performed. The selected maintenance activities included:

Planned Work

- Unit 1A core spray system outage

Emergent Equipment Problems

- Unit 1A core spray system unplanned unavailability
- Unit 1A reactor feed pump inverter out of service (impacted the anticipated transient without scram mitigation, feed pump runback feature)
- HV-061-112 primary containment isolation valve failed to close

b. Findings

No findings of significance were identified.

1R14 Personnel Performance During Non-routine Plant Evolutions (71111.14)

.1 Unit 2 Reactor Level Transient

a. Inspection Scope

The inspectors reviewed operator actions and Exelon's investigation activities related to a reactor level transient that occurred on July 27, 2002. The inspectors discussed the event with operators and operations management. The following documents were reviewed:

- Condition Report 117264
- Prompt Investigation Report 117264
- Operator Logs
- Reactor level and feedwater system data records for July 27
- Operating Procedure S06.1.C, "Placing a Standby Reactor Feed Pump in Service."

b. Findings

Introduction

The inspectors identified a finding of very low safety significance (Green) that is also a non-cited violation of Technical Specification 6.8.1, "Procedures," because operators failed to follow procedures while placing a reactor feed pump in service, which led to a significant reactor level transient.

Description

On July 27, 2002, while changing feedwater system modes of operation on Unit 2 from startup to normal level control, reactor level increased from the normal level of 35" to 47" and then dropped to 14", just above the low level scram setpoint of 12.5". The drop in reactor level occurred because operators did not follow key steps in feedwater system Operating Procedure S06.1.C, "Placing a Standby Reactor Feed Pump in Service." Instead of following the procedure specified sequence of adjusting the controller signals and placing the oncoming reactor feed pump motor gear unit in "Auto" prior to placing the Master Level Controller in "Auto," the operators placed the Master Level Controller in "Auto" before they adjusted controller signals and placed the oncoming reactor feed

pump motor gear unit in “Auto.”

Analysis

The inspectors identified a performance deficiency, because operators’ failed to properly implement an operating procedure for placing a reactor feed pump in service. The procedure was described in Regulatory Guide 1.33, as required by Technical Specification 6.8.1. Traditional enforcement does not apply, because the issue did not have any actual safety consequences or potential for impacting the NRC’s regulatory function and was not the result of any willful violation of NRC requirements or Exelon procedures. The finding was considered more than minor because it is similar to example 4.b “Insignificant Procedural Errors” in Appendix E of NRC Inspection Manual 0612 “Power Reactor Inspection Reports.” The procedural error made by the operators caused a significant level transient that almost resulted in an unplanned automatic reactor shutdown. The finding affected the Initiating Events cornerstone because the procedural error made by the operators increased the likelihood of an initiating event, specifically an unplanned automatic reactor shutdown due to a low reactor water level condition. This finding was determined to have very low safety significance (Green) by Phase 1 of the Reactor Inspection Findings for At-Power Situations Significance Determination Process because it did not contribute to the likelihood of a loss of coolant accident initiator, the unavailability of mitigation equipment, or fire and flooding events.

The inspectors identified that this finding involved a human performance error because control room operators performed procedural steps out of sequence during a non-routine feed pump evolution. Other human performance factors that contributed to this event included ineffective control room supervisory oversight when the evolution was being performed and ineffective communications, including a lack of a pre-evolution briefing, between the control room supervisor and reactor operator.

Enforcement

Technical Specification 6.8.1 requires, in part, that written procedures be implemented covering the applicable procedures in Appendix “A” of Regulatory Guide 1.33, Revision 2, February 1978. Appendix “A” of Regulatory Guide 1.33 includes procedures for changing feedwater system modes of operation. Exelon Procedure S06.1.C, “Placing a Standby Reactor Feed Pump in Service,” Section 4.2, states, in part, that operators shall adjust controller signals and place the oncoming reactor feed pump motor gear unit in “Auto” prior to placing the Master Level Controller in “Auto.” Contrary to the above, operators placed the Master Level Controller in “Auto” prior to adjusting controller signals and placing the oncoming reactor feed pump motor gear unit in “Auto.” The failure to properly implement Exelon Procedure S06.1.C is being treated as a Non-Cited Violation (NCV), consistent with Section VI.A. of the NRC Enforcement Policy. This issue is documented in Exelon’s corrective action program as Condition Report (CR) 117264. **(NCV 50-353/02-05-02)**

.2 Unit 2 Reactor Manual Shutdown

a. Inspection Scope

The inspectors observed operator actions and post-scram review activities following a

Unit 2 manual reactor shutdown (scram) on July 23, 2002. These actions were taken in response to decreasing condenser vacuum, which occurred due to condensate temperature exceeding the design limit of the steam jet air ejector condenser. The following documents were reviewed:

- GP-18, Scram/ATWS Event Review
- Condition Reports 116740, 116754
- Operator Logs

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope

The inspectors reviewed operability determinations that were selected based on risk insights, to assess the adequacy of the evaluations, the use and control of compensatory measures, and compliance with the technical specifications. In addition, the inspectors reviewed the selected operability determinations to verify whether the determinations were performed in accordance with Exelon Procedure LS-AA-105, "Operability Determinations." The inspectors used the technical specifications, UFSAR, associated design basis documents, and applicable action request and condition report documents during these reviews. The issue(s) reviewed included:

- (A1325715) Unit 2 feedwater master controller
- (A1375101) Unit 1 reactor high level reactor feed pump and main turbine trips
- (CR106364) Safety relief valve operability determination
- (A1382093) Unit 1 "A" reactor enclosure recirculation system degraded flow indication
- (A1383749) Unit 2 reactor core isolation cooling minimum flow valve failure

b. Findings

No findings of significance were identified.

1R16 Operator Workarounds (71111.16)

a. Inspection Scope

The inspectors reviewed operator workarounds and operator challenges on Unit 2. The inspectors evaluated the cumulative effects of these items on the ability of operators to respond in a correct and timely manner. The inspectors also reviewed selected equipment deficiencies to determine if there were any items that complicated the operators' ability to implement emergency operating procedures, but were not identified as operator workarounds. The items included:

- Feedwater Master Controller sluggishness (A1325715)
- FV-C-006-206A Piping Leak (A1335791/A1320799)

b. Findings

No findings of significance were identified.

1R17 Permanent Plant Modifications (71111.17)

.1 Drywell Shield Removal Modification

a. Inspection Scope

The inspectors reviewed modification-related aspects of drywell shield removal (second layer) prior to Mode 4. The inspectors examined Engineering Change Request 00-01520, walked down the installed modification, and discussed the modification with engineering personnel.

b. Findings

No findings of significance were identified.

.2 Main Turbine Retrofit and Associated Change to GP-5, "Steady State Operations"

a. Inspection Scope

The inspectors reviewed an analysis to support a change to procedure GP-5, "Steady State Operations" that revised main turbine back pressure limits and ultimately allowed operation at higher condensate temperatures. The inspector reviewed this change because a Unit 2 loss of main condenser vacuum condition occurred, which required a manual reactor shutdown, within the allowed higher condensate temperatures on July 23, 2002. The inspectors discussed the issue with engineering personnel and reviewed the following documents:

- 10 CFR 50.59 screening form for changes to procedure GP-5, Steady State Operations, Revision 66
- LRC-C-13, 10 CFR 50.59 Reviews, Revision 7
- Mod-C-9, Design Control and Processing of Engineering Change Requests (ECRs), Revision 8
- Condition Report 116740
- Licensee Event Report 2-02-001

b. Findings

Introduction

The inspectors identified a non-cited violation of very low safety significance (Green), because Exelon staff did not analyze the effect of the increased condensate temperature on all components potentially impacted. Exelon engineering and chemistry personnel did not correctly follow procedures when conducting a 10 CFR 50.59 screening for a change to Procedure GP-5, "Steady State Operations."

Description

On July 23, 2002, operators manually tripped Unit 2 due to degrading main condenser vacuum. The main condenser air removal system failed to function when condensate temperature in the steam jet air ejector condenser exceeded 147 °F. Limerick staff made a change to procedure GP-5 "Steady State Operations," in support of the 1999 main turbine replacement that permitted the maximum condensate temperature to increase from about 135°F up to 150 °F.

The inspectors noted that Exelon engineering and chemistry personnel did not perform a safety evaluation, but only performed a 50.59 screening review of the change to procedure GP-5. The inspectors concluded that the engineering and chemistry personnel who performed the screening and an addendum to the screening incorrectly addressed the screening question concerning whether the change affected a procedure as described in the Safety Analysis Report (SAR). The procedure being changed (GP-5) was referenced in the SAR and the changes involved condenser back pressure limitations which were also referenced in the SAR. The engineering and chemistry personnel who performed the review incorrectly concluded that the proposed procedural change was being made to a general plant procedure which was not explicitly described in the SAR and therefore no further analysis was required. As a result, the Limerick staff did not perform a safety evaluation and did not analyze the effect of the increased condensate temperature on all components potentially impacted.

Analysis

The failure to perform a safety evaluation for a change to GP-5 that increased the operating condensate temperature is a performance deficiency because engineering and chemistry personnel did not correctly follow Exelon's design change procedures. Traditional enforcement does not apply because the issue did not have any actual safety consequences or potential for impacting the NRC's regulatory function and was not the result of any willful violation of NRC requirements or Exelon procedures. The finding was considered more than minor in that the issue was associated with the design control (plant modifications) attribute of the Initiating Events cornerstone, and it affected the cornerstone objective. The Initiating Events cornerstone objective was affected because the procedure change permitted conditions which caused an actual degradation of main condenser vacuum and a reactor shutdown. The failure of engineering and chemistry personnel to correctly follow the design change procedures, which resulted in a degradation of main condenser vacuum, was determined to have very low safety significance (Green) using a Phase 1 analysis. Although the finding contributed to an unplanned reactor shutdown it did not affect the availability of

mitigation equipment, it did not contribute to the likelihood of a loss of coolant accident initiator, and it did not contribute to the likelihood of a fire or flood event.

The inspectors identified that this finding involved a human performance error because engineering and chemistry personnel did not correctly evaluate whether the proposed change affected the Safety Analysis Report.

Enforcement

The inspectors concluded that the finding involving failure of engineering and chemistry personnel to correctly follow design change procedures for a change to GP-5, was a violation of 10 CFR 50.59 in that a written safety evaluation was not prepared that provided the bases for why the change did not involve an unreviewed safety question and was therefore allowed without prior NRC approval. Specifically, Exelon did not analyze if the probability of occurrence of an accident or malfunction of equipment important to safety, related to degradation of main condenser vacuum and previously evaluated in the safety analysis report, was increased by the procedure change. The failure to document a safety evaluation is being treated as a Non-Cited Violation (NCV), consistent with Section VI.A. of the NRC Enforcement Policy. This issue is documented in Exelon's corrective action program as Condition Report (CR) 116740. **(NCV 50-353/02-05-03)**

.3 Biennial Inspection of Permanent Plant Modifications (71111.17B)

a. Inspection Scope

The inspectors reviewed selected risk-significant permanent plant modification packages to verify that: (1) the design bases, licensing bases, and performance capability of risk significant systems, structures and components (SSCs) had not been degraded through modifications; and, (2) modifications performed during increased risk configurations did not place the plant in an unsafe condition.

The inspectors evaluated modification design change packages to verify that the modifications did not degrade system availability, reliability, or functional capability of the related SSCs. Modifications were selected based on risk insights for the Limerick site and included SSCs for the event initiator, barrier integrity and mitigating systems cornerstones. The inspectors verified that selected, as modified, attributes were consistent with the design bases. These included: safety classification, energy requirements supplied by supporting systems; materials and replacement component compatibility with physical interfaces; component seismic qualification; instrument set-points, uncertainty calculations, electrical coordination studies, electrical loads analysis adequacy, and equipment environmental qualification. Design assumptions were reviewed to verify that they are technically appropriate and consistent with the UFSAR. For each modification, the 50.59 Screenings or Evaluations were reviewed as described in Section 1R02 of this report. Post modification testing was reviewed to verify the installation process established initial operability. Inspectors verified that procedures were properly updated with revised design information and operating guidance. The inspection team also verified that the as-built configuration was accurately reflected in the design documentation.

The plant modification reviews included walkdowns of plant components, interviews with plant staff, and the review of applicable documents including: procedures, engineering calculations, modification packages, evaluations, site drawings, corrective action documents, applicable sections of the UFSAR, Technical Specifications, and system design basis documents.

In addition, the inspectors reviewed self assessments and quality assurance audits of modification activities and a sample of condition reports documenting problems identified by Exelon in its corrective action program related to plant modifications to verify the effectiveness of corrective actions. A listing of the plant modifications and condition reports reviewed is provided in Attachment 1.

b. Findings

No findings of significance were identified.

1R19 Post Maintenance Testing (71111.19)

a. Inspection Scope

The inspectors reviewed the effectiveness of maintenance and post-maintenance testing associated with the failure of the setpoint setdown function of the feedwater control system following a Unit 1 scram on May 19, 2002. The inspectors discussed the issue with maintenance personnel and reviewed the following documents:

- Maintenance Work Order R0844859
- Electrical prints 791E408TR
- Condition Reports 113822 and 114530

b. Findings

Introduction

The inspectors identified a finding of very low safety significance (Green), because an Exelon maintenance technician did not follow the work order for conducting preventive maintenance on the feedwater control system. Consequently, a wire that was disconnected during the activity was improperly restored, which disabled the setpoint setdown function of the feedwater control system. The wiring error led to a post-scram high reactor level and a trip of the reactor feed pumps, which caused the loss of the power conversion system function following the scram.

Description

On May 19, 2002, following a Unit 1 turbine trip and reactor scram, the setpoint setdown function of the feedwater control system failed to actuate. This condition led to a trip of the reactor feed pumps on high reactor level which caused the loss of the power conversion system safety function.

The inspectors' review revealed that the maintenance technician who performed preventive maintenance on the feedwater control system incorrectly reattached a wire due to a failure to follow the applicable maintenance work order R0844859. The work order specified resetting the setpoint setdown logic using the reset switch located in the control room, but also provided the alternative of temporarily lifting a wire in the control circuit to reset the logic. The work order specified temporarily lifting the wire connecting K10-2AT2 to K10-L1 using a lifted lead and component manipulation log. Instead, the technician removed a different wire, did not properly restore the wire, and he did not use the lifted lead and component manipulation log which would have required a second technician to verify that the wire was correctly reattached.

Analysis

The failure of the maintenance technician to remove the correct wire, properly restore the wire and use the lifted lead log for maintenance on the setpoint setdown function of the feedwater control logic is a performance deficiency in that he did not follow Exelon's instructions of a preventive maintenance work order. Traditional enforcement does not apply because the issue did not have any actual safety consequences or potential for impacting the NRC's regulatory function and was not the result of any willful violation of NRC requirements or Exelon procedures. The finding was considered more than minor because it caused a failure of the setpoint setdown function of the feedwater control system and was associated with an attribute of the Mitigating Systems cornerstone and affected the cornerstone objective. The specific attribute was equipment performance (reliability) and it affected the cornerstone objective in that the failure of the setpoint setdown function of the feedwater control system did not ensure the availability of the power conversion system to respond to initiating events to prevent undesirable consequences. The failure of the maintenance technician to follow the work order, resulting in failure of the setpoint setdown function that directly contributed to an automatic trip of all three feedwater pumps was determined to have very low safety significance (Green) using a Phase 3 analysis.

The SDP results for this issue are the same as those from a related performance deficiency involving an inadequate post-scram review, documented in NRC Report 50-352; 353/02-04, Section 1R14. In summary, Phase 1 of the Reactor Inspection Findings for At-Power Situations SDP screened this finding to Phase 2 because it resulted in a loss of safety function of one or more non-Technical Specification trains of equipment designated as risk-significant per 10 CFR Part 50.65 for greater than 24 hours. Phase 2 estimated the risk significance of this finding due to internal initiating events as White. A review of the Phase 2 results indicated that this result was conservative. Therefore, a Phase 3 analysis of this finding was performed. The Phase 3 analysis was performed using information from Exelon's more detailed risk analysis and determined that the issue was of very low safety significance (Green).

The inspectors identified that this finding involved a human performance error by the maintenance technician because he did not restore the setpoint setdown function to service in a manner specified by the maintenance work order.

Enforcement

The inspectors concluded that the maintenance performance deficiency discussed above did not constitute a violation of regulatory requirements because the maintenance activities were not on safety related components. Additionally, the inspectors identified no violations of 10 CFR 50.65, Maintenance Rule, related to these activities. This issue is documented in Exelon's corrective action program as Condition Report (CR) 114530. **(FIN 50-352/02-05-04)**

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

The inspectors reviewed and observed portions of surveillance tests and compared test data with established acceptance criteria to verify the systems demonstrated the capability of performing the intended safety functions. The inspectors also verified that the systems and components maintained operational readiness, met applicable technical specification requirements, and were capable of performing the design basis functions. The surveillance tests included:

- ST-6-092-312-1, D12 diesel generator slow start operability test run
- ST-6-048-230-2, Standby liquid control system pump, valve, and flow test
- ST-6-092-323-1, D13 diesel generator load reject test
- ST-2-055-101-1, high pressure coolant injection logic system functional test

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

Cornerstone: Occupational Radiation Safety [OS]

2OS2 ALARA Planning and Controls

a. Inspection Scope

Limerick's current station ALARA performance (1999-2001) ranks in the first quartile of BWR plants. NRC Inspection Procedure 7112102, specifies the expenditure of minimal ALARA inspection resources for first quartile performers. This inspection was limited to a review of the ALARA performance during the Spring 2002 Limerick Unit 1 refueling outage (83 person-rem) in accordance with 10 CFR 20.1101(b) and with the screening criteria contained in the Occupational Radiation Safety Significance Determination Process. The review utilized Limerick's Unit 1 Ninth Refuel Outage Report and included interviews with the radiological engineering and chemistry staff. Inspection areas

reviewed included the highest exposure outage tasks as follows: drywell in-service inspection, drywell piping insulation, drywell scaffolding, control rod drive replacements (23), drywell snubbers, drywell shielding, and main safety relief valve replacement. Actual exposure performance was compared to estimated exposure performance to evaluate Limerick Unit 1 outage ALARA performance achieved. Recent radiological source term dose rate data and applicable reactor water chemistry operating data were also reviewed.

b. Findings

No findings of significance were identified.

Cornerstone: Public Radiation Safety [PS]

2PS1 Gaseous and Liquid Effluents (71122.01)

a. Inspection Scope

The inspector reviewed the following documents to evaluate the effectiveness of Exelon's radioactive gaseous and liquid effluent control programs. The requirements of the radioactive effluent controls were specified in the Technical Specifications/Offsite Dose Calculation Manual (TS/ODCM):

- 2000/2001 Radiological Annual Effluent Release Reports and Radiation Dose Assessment Report;
- ODCM, Revision 20, September 1999, and technical justifications and 10CFR50.59 evaluations, for ODCM changes made;
- selected 2002 analytical results for charcoal cartridges, particulate filters, noble gases, and radioactive liquid effluent samples;
- implementation of the compensatory sampling and analysis program when the effluent radiation monitoring system (RMS) is out of service;
- selected 2002 radioactive liquid release permits;
- monthly radioactive gas releases including quantification technique and projected dose calculation results to the public;
- associated effluent control procedures, including analytical laboratory procedures;
- calibration records for laboratory measurements equipment (gamma spectrometry systems, liquid scintillation counter, and proportional counters);
- implementation of measurement laboratory quality assurance and control programs specified in Section 6.8.1.j of the TS, including interlaboratory and intralaboratory comparisons;
- 2001/2002 QA audits for the radiological effluent control/ODCM implementations;
- 2001/2002 Continuous Oversight Quarterly Reports (NOSA-LG-01-03, and -04; NOSA-LG-02-01 and -02);
- most recent surveillance testing results [(1)visual inspection, (2) delta P, (3) in-place testing for HEPA, (4) in-place testing for charcoal filters, (5) air capacity test (flow rate), and (6) laboratory test for iodine collection efficiency] for the following air treatment systems:
  - TS 3/4.7.2 Control Rooms (Trains A and B);
  - TS 3/4.6.5.3 standby gas treatment system air cleaning systems (Trains A and B); and

  - TS 3/4.6.5.4 reactor enclosure area air cleaning systems (Trains A and B for both units).
- most recent effluent radiation monitoring system (RMS) channel calibration and flow monitor calibration results listed in Table I3.1-1 and I3.1-2 of the ODCM and accident RMS;

RMS Channel Calibration

- Liquid Radwaste Effluent Line Monitors (Common)
- RHR Service Water system Effluent Line Monitors (Common)
- Service Water System Effluent Line Monitors (Common)
- South Stack Noble Gas Monitors (Units 1 and 2)
- North Stack Noble Gas Monitors (Common)
- North Stack Wide Range Accident Monitor specified in TS 3.3.7.5 and ODCM Figure II-2-1

Flow Monitor Calibration

- Liquid Radwaste Effluent Line Flow Rate Measurement Device
- Discharge Line Flow Rate Measurement Device
- South Stack Effluent System Flow Rate Monitors (Units 1 and 2)
- North Stack Effluent System Flow Rate Monitor
- Hot Maintenance Shop Effluent System Flow Rate Monitor

The inspector also performed the following activities to evaluate the effectiveness of Exelon's radioactive gaseous and liquid effluent control programs:

- walk-down for determining the availability of radioactive liquid/gaseous effluent RMS;
- walk-down for determining the availability of air cleaning systems and for determining the equipment material condition; and
- observation for offgas sampling techniques.

The inspector reviewed the following documents to evaluate the effectiveness of Exelon's problem identification and resolution processes:

- Condition Reports (CRs) and corrective actions for the implementation of the ODCM/RETS [CR Nos. 61273; 95809; 105526; 83422; 100609; 113678; 60852; 78756; 108348; 123582; 124306; and 124119]; and
- 2002 Self-Assessments for the RETS.

b. Findings

No findings of significance were identified.

3. SAFEGUARDS
Cornerstone: Physical Protection [PP]

3PP3 Response to Contingency Events (71130.03)

.1 Safeguards Advisory Review

The Office of Homeland Security (OHS) developed a Homeland Security Advisory System (HSAS) to disseminate information regarding the risk of terrorist attacks. The HSAS implements five color-coded threat conditions with a description of corresponding actions at each level. NRC Regulatory Information Summary (RIS) 2002-12a, dated August 19, 2002, "NRC Threat Advisory and Protective Measures System," discusses the HSAS and provides additional information on protective measures to licensees.

a. Inspection Scope

On September 10, 2002, the NRC issued a Safeguards Advisory to reactor licensees to implement the protective measures described in RIS 2002-12a in response to the Federal government declaration of threat level "orange." Subsequently, on September 24, 2002, the OHS downgraded the national security threat condition to "yellow" and a corresponding reduction in the risk of a terrorist threat.

The inspectors interviewed Exelon personnel and security staff, observed the conduct of security operations, and assessed Exelon's implementation of the threat level "orange" protective measures. Inspection results were communicated to the region and headquarters security staff for further evaluation.

b. Findings

No findings of significance were identified.

.2 Response to Contingency Events Inspection

a. Inspection Scope

The following activities were conducted to determine the effectiveness of Limerick's Response to Contingency Events, as measured against the requirements of 10 CFR 73.55 and the Limerick Safeguards Contingency Plan:

- Performance testing of the intrusion detection system on July 17, 2002. The inspector toured the entire perimeter and selected five specific areas of potential vulnerability in the intrusion detection system for testing. The inspector observed a Security Force Member at Limerick perform crawl, jump and run testing at these locations.

- Observation of firearms proficiency on July 18, 2002. The inspector observed five security force members demonstrate their proficiency on the course of fire for stress firing. In addition, the inspector reviewed eight firearms qualification training records.

The inspector reviewed the following to determine Exelon's preparation to respond to security events, as measured against the requirements of 10 CFR 73.55 and the Limerick Safeguards Contingency Plan:

- Documentation associated with Exelon's force-on-force exercise program on July 15, 2002. The review included documentation and critiques for security exercises conducted in the first quarter of 2002.

- Exelon's defensive strategy, response time lines, target sets, and relevant implementing procedures applicable at Limerick.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES [OA]

4OA1 Performance Indicator Verification (71151)

a. Inspection Scope

The inspectors reviewed the accuracy and completeness of the supporting data for the following Limerick performance indicators:

- Unplanned Power Changes (July 2001 to June 2002)
- Unplanned Scrams with Loss of Normal Heat Removal (April 2001 to June 2002)

b. Findings

No findings of significance were identified.

4OA2 Problem Identification and Resolution (71152)

The inspectors reviewed Exelon's corrective action identification and resolution process through the review of Condition Reports (CR) associated with the maintenance activities (listed in Attachment 1). The review included the process of identifying the problem, clarity of description, and the process of development of the corrective action and implementation. The inspectors verified that problems and concerns in the maintenance area were identified, documented, evaluated, and entered in the corrective action system.

Selected Issue Follow-up Inspection - Standby Liquid Control Pump Relief Valve Setpoints

The inspectors reviewed condition reports to ensure that Exelon was identifying, evaluating, and correcting problems and that the corrective actions for these issues were appropriate. Exelon initiated Condition Report (CR) 75653 in response to an NRC finding (FIN 50-353/01-11-02) for low Standby Liquid Control (SLC) pump relief valve setpoints. This CR was also included in a Common Cause Analysis Report (CR 103135, "Thoroughness of Technical Evaluations") generated to address NRC concerns about human performance in engineering.

Overall, Exelon adequately characterized the issues surrounding the low SLC pump relief valve setpoints. The apparent cause evaluation was performed in accordance with Exelon procedure LS-AA-125-1003 (Apparent Cause Evaluation Manual). However, the inspectors identified two issues that do not meet the level of a finding, but are included in the report as observations, in accordance with Manual Chapter 0612, Appendix D:

- First, Exelon's corrective actions did not address all aspects of the determined apparent causes. Specifically, one of the apparent causes involved a less than adequate review of vendor calculations, a human performance issue. However, Exelon's corrective actions did not address this human performance issue; the corrective actions focused solely on technical and design changes.

- Secondly, the inspectors noted that a Common Cause Analysis Report, CR 103135, recommended additional training to engineering personnel on the importance of challenging vendor information. However, the Common Cause review concluded that the issues were historical in nature and the causes were previously addressed by other corrective actions. This review concluded, incorrectly, that the corrective actions for each issue examined were properly addressed within the respective original condition reports.

b. Findings

No findings of significance were identified.

4OA3 Event Followup (71153)

.1 Unit 2 Reactor Scram

Section 1R14 describes NRC event followup for a Unit 2 reactor scram that occurred on July 23, 2002.

.2 SER 1-02-001

Unauthorized access to Protected Area. The inspectors reviewed the Safeguards Event Report (SER) and identified no findings of significance. This issue is documented in Condition Report 97441. It constituted a violation of minor significance that is not subject to enforcement action in accordance with Section IV of the NRC Enforcement Policy. This SER is closed.

.3 LER 1-02-003

Scram due to actuation of the main turbine thrust bearing wear detector. The inspectors reviewed the LER and identified no findings of significance and no violations of NRC requirements. This issue is documented in Condition Report 108699. This LER is closed.

.4 LER 2-02-001

Unit 2 scram due to degraded main condenser vacuum. The inspectors reviewed this event as described in Sections 1R14 and 1R17 of this report. The event is documented in Condition Report 116740. No new findings of significance were identified during the LER review. This LER is closed.

.5 LER 2-02-002

Unit 2 offgas hydrogen analyzers inoperable. The inspectors reviewed the LER and identified no findings of significance. This issue is documented in condition report 116909. It constituted a violation of minor significance that is not subject to enforcement action in accordance with Section IV of the NRC Enforcement Policy. This LER is closed.

4OA6 Meetings, Including Exit

The resident inspectors presented the inspection results to Mr. Levis and other members of station management on October 4, 2002.

The security specialist inspectors met with Exelon representatives at the conclusion of the Security Response to Contingency Events inspection on July 18, 2002.

The inspector for the post-outage radiation safety inspection of the Unit 1 - Spring 2002 refueling outage and ALARA planning and controls discussed the results of this inspection with members of Exelon management on July 23, 2002.

The inspector for the Gaseous and Liquid Effluents Inspection presented the results of this inspection to Exelon management and other staff on September 23, 2002.

Inspectors presented the permanent plant modification inspection results to Exelon management at the conclusion of the inspection on August 22, 2002. The lead inspector asked Exelon whether any materials examined during the inspection should be considered proprietary. Some proprietary items were reviewed and returned during the inspection, but no proprietary information is presented in this report.

The inspector presented the results of the Maintenance Effectiveness Biennial Inspection to members of Exelon management and staff on September 27, 2002.

ATTACHMENT 1

SUPPLEMENTAL INFORMATION

a. Key Points of Contact

Exelon Generation Company

R. Braun	Plant Manager
E. Callan	Director - Operations
J. Perry	Director - Maintenance
C. Mudrick	Director - Engineering
W. Levis	Site Vice President
M. Kaminski	Manager, Regulatory Assurance
W. Harris	Radiation Protection Manager

b. List of Items Opened, Closed, and Discussed

Closed

SER 1-02-001	Unauthorized Access to Protected Area (Section 4OA3)
LER 1-02-003	Scram due to actuation of the main turbine thrust bearing wear detector (Section 4OA3)
LER 2-02-001	Unit 2 Scram due to Degraded Main Condenser Vacuum (Sections 1R14 and 4OA3)
LER 2-02-002	Unit 2 Offgas Hydrogen Analyzers Inoperable (Section 4OA3)

Opened and Closed

FIN 50-352/02-05-01	Feed pump discharge valve breaker maintenance error (Section 1R12)
NCV 50-353/02-05-02	Failure to follow procedures while changing feedwater system modes of operation (Section 1R14)
NCV 50-353/02-05-03	Failure to follow design control procedures for 10 CFR 50.59 screening (Section 1R17)
FIN 50-352/02-05-04	Feedwater control system maintenance error (Section 1R19)

c. List of Documents Reviewed

Permanent Plant Modifications (Including 50.59 Evaluations)

ECR LG 01-00038	Installation of Auxiliary Work Platform
ECR LG 00-00037	Core Spray Valve HV-052-1(2)F037 Wedge Gate Pressure Locking
ECR LG 00-01837	Closure of CRD Hydraulic Pump Minimum Flow Check Valves
ECR LG 99-02000	Noble Metals Injection Monitoring System - Unit 2
ECR LG 00-00584	Noble Metals Injection Monitoring System - Unit 1
ECR LG 00-00589	Noble Metals Primary Water Injection
ECR LG 00-01214	CRD Maintenance in Parallel with Fuel Movement (not implemented)
ECR LG 99-02161	(Late Add 1R08) 52-1F037 Remove Pressure Lock Pipe Drill Wedge
ECR LG 99-02201	Install Level Gauge and Bypass on Unit #2 HPCI - late add
ECR LG-00-00002-001	CRD Pump Minimum Flow Line Modifications
ECR LG-98-02058-001	TPA to Electrically Backseat HV-041-1F016
ECR LG-01-00071	Revise UFSAR to Support DWCW to RECW in all Opcons
ECR LG-01-00872	Clarify UFSAR and DBDs Regarding PCIG & ADS
ECR LG-01-05125	OT-101 Bases, High Drywell Pressure Bases Rev. 23
ECR LG 98-01872	HV-55-1F003 NCR Due to Loss of Actuator Run Efficiency
ECR LG 98-01884	Margin Improvement for PCIV HV-055-2F003 During 2R05
ECR LG 99-01865	Final Resolution for RHR Shutdown Cooling Suction Isolation Valves Fire Safe Shutdown Manual Action
ECR LG 99-02295	MOD P00662 Unit 2 RFPT: "C" UPS Replacement
ECR LG 02-00239	Reconfigure the LGS Emergency Sirens 120 VAC Power Supply

10 CFR 50.59 Safety Evaluations

ECR LG 98-01884	Margin Improvement for PCIV HV-055-2F003 During 2R05
ECR LG 99-01865	Final Resolution for RHR Shutdown Cooling Suction Isolation Valves Fire Safe Shutdown Manual Action
ECR LG 99-01964	HV-057-121/131 Intrlk: Disposition for NCR 97-02842, Unit 1
ECR LG 99-01965	HV-057-221/231 Intrlk: Disposition for NCR 97-02842, Unit 2

10 CFR 50.59 Safety Screens

LG2001S242	RHR Hx partition plate repair
LG2001S252	Zinc injection startup
LG2001S267	HPCI room cooler
LG2001S285	HPCI pump, valve and flow test
LG2001S307	EDG 24 FO transfer pump test
LG2001S315	ECR 01-00816, ESW breakers for valves to/from EDGs
LG2001S326	ECR 01-00872, Clarify UFSAR and DBDs regarding PCIG and ADS
LG2002S026	ECR 01-01152, HPCI Injection
LG2002S036	Shutdown Margin Determination
LG2002S044	Shift Reactor Engineer Guideline
LG2002S084	Primary Containment Control

LG2002S087	Guidelines for Fuel Preconditioning
LG2002S112	LGS EP Sirens, 120 Volt power supply
LG2002S123	High DW pressure
LG2002S127	Changes to Grid Emergency Procedure E-5
LG2002S155	EHC Isolation Valves for U2 Turbine
LG2002S162	Reactor Low Level
LG2002S166	Reactor Vessel Pressure and Temperature Monitoring (Heatup/Cooldown limits)
PORC/SQR/	Kennett Square Review and Approval Form, Implementing MA-AA-716-022
LG2002S175	Suppression Pool, Gross Input Leak Rate Determination
LG2002S178	ESW Pipe Support Removal for NDE of a Pinhole Leak
LG2001S325	ECR LG 01-01110, Unit 1 RWCU PP Low Flow Trip Time Delay
ECR LG 97-02842	HV-057-*21 and HV-057-*31 Uncontrolled Opening
ECR LG 98-01872	HV-55-1F003 NCR Due to Loss of Actuator Run Efficiency
ECR LG 99-02295	MOD P00662 Unit 2 RFPT: "C" UPS Replacement
ECR LG 00-01217	H2O2 Analyzer Changes SPDS Computer Display From CMTN Bad
ECR LG 02-00239	Reconfigure the LGS Emergency Sirens 120 VAC Power Supply

Design References

P&ID M-0046, Sheet 2
DBD# L-S-59, Refueling Platform System
Design Basis Documents

Procedures

LS-AA-104, Rev. 2	Exelon 50.59 Review Process
LS-AA-104-1000, Rev. 0	Exelon 50.59 Resource Manual
M-C-700-332 Rev. 9	Rigging and Handling Heavy Loads
MA-AA-716-022, Rev. 0	Control of Heavy Loads Program
S97.1.B, Rev. 0	Fuel Floor Auxiliary Platform Startup, Checkout, Operation & Shutdown
E-5, Rev. 3	Grid Emergency
CC-MA-102, Rev. 0	Design Inputs and Impact Screening
CC-MA-102-1001, Rev. 0	Design Inputs and Impact Screening
CC-MA-103, Rev. 0	Configuration Changes
CC-MA-103-1001, Rev. 0	Implementation of Configuration Changes
MOD-C-9, Rev. 12	Design Control and Processing of Engineering Change Requests (ECRs)

Corrective Action Documents

A1159513	AC Electrical Load Review for 98-01884
A1279729	Provide Calibration Information for Primary Containment H^2 and O^2 U1/U2 PMS Computer Points
A1359758	Evaluate Conduit and Safety Switch Supports for ECR 02-00239
PEP I0011669	H^2 O^2 SPDS Display of Process Computer Went to Fail

CR 0011955	CR 00119554
CR 00119290	CR 00119558
CR 00119303	CR 00119565
CR 00119312	CR 00110616
CR 00119203	CR 00120805
CR 00098495	CR 00120297

Report dated 11/30/01 on Design Engineering Focus Area Assessment of 10/29-11/9/01

Drawings

8031-M-51, Sht. 1, Residual Heat Removal (Unit 1), Rev. 60
8031-M-51, Sht. 3, Residual Heat Removal (Unit 1), Rev. 61

Regulatory References and Other Documents

NRC Bulletin 96-02
NUREG-0612
Letter from G. Hunger, Director - Licensing, dated 5/10/96 to US NRC on Peach Bottom Atomic Power Station Response to NRC Bulletin 96-02.
Limerick Generating Station Unit 1 Ninth Refuel Outage Report
Condition Reports: 104198, 105156, 108487, 111807, 112127, 115370, 115840
Safeguards Event Reports for the last two quarters of 2001 and the first two quarters of 2002
Limerick Training and Qualification Plans
Limerick Contingency Plan
Limerick Physical Security Plan
Selected personnel training records

Partial List of Maintenance Documents Reviewed

Maintenance Rule Periodic Assessment, Limerick Generating Station, Unit 1 for the period March 1, 2000 through February 28, 2002

Maintenance Rule Periodic Assessment, Limerick Generating Station, Unit 2 for the period March 1, 1999 through February 28, 2001.

Semi-Annual System Status Report - Feb-June, 2002
Systems: ESW 11; NB/SRV 41A; TGA 78G; CECW 90; LC 101; PCIS 72; EDG 92A; and SMT 35.
System Health Overview Reports for selected systems
System Reports - Focus List for selected systems

Monthly Ship System Reports for (a)(1) and (a)(2) systems.

Condition Reports:
CR 00106518, 'A' MCR Chiller failure- MRFF
CR 00101957, 'B' CE Chiller Faulty Bearing Hi Temp Trip Sensor
CR 00113865, 'A' MCR Chiller failure, MR FF(6/27/02)
CR 00107034, 'B' MCR Chiller failure, MR FF

Focused Area Self-assessment: Limerick Maintenance Rule, Dated July 10, 2001.

Procedures:
ER-AA-310, Rev. 1, Implementation of The Maintenance Rule,
ER-AA-310-1005, Rev. 0, MR- Dispositioning between (a)(1) and (a)(2)
ER-LG- 310-1010, Maintenance Rule Implementation, Rev. 1

Root Cause Analysis: 2N SRV and CR 60832 (PEP I00012314)

d. List of Acronyms

ADS	Automatic Depressurization System
ALARA	As Low As is Reasonably Achievable
ATWS	Anticipated Transient Without Scram
BWR	Boiling Water Reactor
CFR	Code of Federal Regulations
CR	Condition Report
CRD	Control Rod Drive
DBD	Design Basis Documents
ECR	Engineering Change Request
EDG	Emergency Diesel Generator
ESW	Emergency Service Water
FIN	Finding
HPCI	High Pressure Coolant Injection
LER	Licensee Event Report
NCV	Non-cited Violation
ODCM	Offsite Dose Calculation Manual
PCIG	Primary Containment Instrument Gas
RFP	Reactor Feed Pump
RHR	Residual Heat Removal
RMS	Radiation Monitoring System
SER	Safeguards Event Report
SDP	Significance Determination Process
SLC	Standby Liquid Control
SRV	Safety Relief Valve
TS	Technical Specifications
UFSAR	Updated Final Safety Analysis Report