July 24, 2002

EA-02-152

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 INSPECTION REPORT 50-352/02-04, 50-353/02-04

Dear Mr. Skolds:

On June 30, 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 July 3, 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 two issues of very low safety significance (green). 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 will issue temporary instructions in the near future to 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 50-352/02-04, 50-353/02-04

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
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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:	50-352/02-04, 50-353/02-04
Licensee:	Exelon Generation Company, LLC
Facility:	Limerick Generating Station, Units 1 & 2
Location:	Evergreen and Sanatoga Roads Sanatoga, PA 19464
Dates:	May 12, 2002 through June 30, 2002
Inspectors:	A. Burritt, Senior Resident Inspector B. Welling, Resident Inspector J. Caruso, Senior Operations Engineer
Approved by:	Mohamed Shanbaky, Chief Projects Branch 4 Division of Reactor Projects

SUMMARY OF FINDINGS

IR 05000352-02-04, IR 05000353-02-04; Exelon Generation Company; on 05/12-06/30/2002; Limerick Generating Station, Units 1 and 2; Personnel Performance During Non-routine Plant Evolutions.

This inspection was conducted by resident inspectors and a Senior Operations Engineer. The inspection identified two Green findings, that 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 inspector identified a finding of very low safety significance (Green) that is also a non-cited violation of Technical Specification 6.8.1, “Procedures.” Exelon did not assess the operational impact of a degraded ‘1A’ recirculation loop temperature instrument. Consequently, when operators used this degraded temperature instrument to monitor coolant temperature while in a Cold Shutdown condition, the operators did not recognize, due to erroneous temperature indication by the degraded instrument, that the actual reactor coolant temperature had exceeded 200 degrees and resulted in an inadvertent operational condition change to a Hot Shutdown condition.

  This finding was determined to be of very low safety significance (Green) by the Reactor Inspection Findings for At-Power Situations because it did not increase the likelihood of a primary system LOCA, did not contribute to the likelihood of a reactor trip, and did not increase the likelihood of a fire or internal/external flood. (Section 1R14)

Cornerstone: Mitigating Systems

- **Green.** The inspector identified a non-cited violation of Technical Specification 6.8.1, “Procedures,” because Exelon did not follow post scram station procedures during the investigation of the cause of an unexpected high reactor water level condition that led to the trip of all three reactor feedwater pumps following a Unit 1 scram on May 19, 2002. Exelon’s post scram review did not identify that the level control setpoint setdown function of the feedwater control system did not actuate which caused the unexpected high reactor water level condition.

  Exelon’s failure to properly investigate the cause of the reactor high water level condition was determined to have very low safety significance (Green) using a Phase 3 analysis. (Section 1R14)

Report Details

Summary of Plant Status

Unit 1 began this inspection period operating at 100% power. On May 19, an automatic reactor shutdown occurred due to a main turbine trip. The Unit 1 reactor was taken critical on May 22, and was returned to 100% power on May 27, 2002.

Unit 2 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.

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

1R04 Equipment Alignment (71111.04)

a. Inspection Scope

The inspectors performed a partial system walk-down 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 systems 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 system:

- Unit 2 high pressure coolant injection system with Unit 2 reactor core isolation cooling system out of service for planned maintenance

The inspectors used system procedure S55.9.A, "Routine Inspection of the HPCI System," and piping and instrumentation diagrams 8031-M-55 and 8031-M-56.

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05)

a. Inspection Scope

The inspectors toured high risk areas at Limerick Unit 2 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 2 reactor feedwater pump lube oil area (fire area 102)
- North stack instrument room and vestibule (fire area 126)
- Unit 1 condensate pump room (fire area 87)
- Unit 1 Safeguard System Access Area (fire area 42)
- Standby Gas Treatment System Filter Compartments and Access Area (fire area

28)

The inspectors reviewed condition report CR 113519, "Combustible Materials Found Staged in Combustible Free Zone - NRC Identified."

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 June 4, 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-2011, and the following off-normal plant procedures and emergency operating procedures:

- T-101, Reactor Pressure Vessel Control
- T-102, Primary Containment Control
- OT-104, Unexpected or Unexplained Positive or Negative Reactivity Insertion
- T-225, Startup and Shutdown of Suppression Pool and Drywell Spray Operation

b. Findings

No findings of significance were identified.

.2 Biennial Review by Regional Specialist

a. Inspection Scope

The Limited Senior Reactor Operator (LSRO) Requalification Program for Fuel Handlers is a dual site operator license program that applies to both Limerick and Peach Bottom. The inspector reviewed recent operating history documentation found in inspection reports, licensee event reports, the licensee's corrective action program, and the most recent NRC plant issues matrix (PIM) for both Limerick and Peach Bottom to detect any operational events that were indicative of possible training deficiencies. The inspector also consulted with the senior resident inspectors at both Limerick and Peach Bottom for additional insights regarding licensed operators' performance.

The inspector followed guidance found in NUREG 1021, Rev. 8, Supplement 1, "Operator Licensing Examination Standards for Power Reactors," and Inspection Procedure Attachment 7111111, "Licensed Operator Requalification Program," Appendix A "Checklist for Evaluating Facility Testing Material." The inspector:

- reviewed the operating and written exams administered the week of May 20, 2002 for quality and performance.

- reviewed the results of the annual operating tests for years 2001 and 2002 and the written exam for 2002 (in office) for quality, performance and grading. The inspector assessed whether failure rates are consistent with the guidance of NUREG-1021, Revision 8, Supplement 1, "Operator Licensing Examination Standards for Power Reactors" and NRC Manual Chapter 0609, Appendix I, "Operator Requalification Human Performance Significance Determination Process (SDP)."

- observed the job performance measures (JPM) administered during the week of May 20, 2002. These observations included facility evaluations of individual performance during the individual performance of 5 JPMs on the refueling bridge/floor at Limerick.

- reviewed the remediation plans for individual failures over the past two year requalification program cycle to assess the effectiveness of the remedial training.

- reviewed Exelon operator license reactivations for the past two year requalification program cycle to ensure that 10 CFR 55.53 license conditions and applicable program requirements were met.

- interviewed Instructors and training/operation's management for feedback regarding the implementation of the program.

- reviewed a sample of records for requalification training attendance, program feedback, reporting, and medical examinations for compliance with license conditions, including NRC regulations.

b. <u>Findings</u>

<u>Introduction</u>

The inspector identified an Unresolved Item that requires Office of Nuclear Reactor Regulation (NRR) guidance and clarification because Exelon's methods and standards to re-activate a LSRO license at Limerick and Peach Bottom may not meet the requirements of 10 CFR 55.53(f)(2).

<u>Discussion</u>

Exelon's methods and standards used at Limerick and Peach Bottom to re-activate a LSRO license may not meet the requirements of 10 CFR 55.53(f)(2). 10 CFR 55.53(f)(2) requires, in part, that the LSRO stand one shift under-instruction under the direction of a senior reactor operator (SRO), and in the position to which the individual will be assigned (i.e., refueling director on the refueling floor). Exelon's practice has been to have a LSRO licensee stand one shift of under-instruction watch. The watch consisted of checking in with the shift manager, spending a few hours in the main control room reviewing refueling related instrumentation and plant status, reviewing the applicable unit Limiting Condition for Operation (LCO) log, and attending shift briefings. The LSRO then spent the remainder and bulk of the shift time on the refueling floor performing a self-directed review and study of procedures, as well as walk-downs and familiarity with equipment. Exelon's current procedure guidance and practice for reactivating a LSRO license provides very little direct SRO oversight or feedback while the LSRO licensee is completing the required one shift under-instruction.

Exelon believes it is in compliance with the LSRO reactivation requirements in 10 CFR 55.53(f)(2). Exelon also stated that their program is based, in part, on an NRC letter addressed to Philadelphia Electric Company, dated October 7, 1993, “Requalification and Reactivation Programs for Senior Reactor Operators Limited to Fuel Handling.” The letter discusses minimum activities needed for reactivation including: 1) a tour of the main control room to become familiar with equipment status; 2) attending shift turnover meetings; 3) tour of the refueling floor for the unit in which core alterations are to be performed; and 4) reviewing the applicable unit Limiting Condition for Operation (LCO) log. However, this letter does not discuss whether the LSRO needs to be in the presence of the supervising SRO when standing the under-instruction watch and to what extent the LSRO under-instruction should be supervised and receives feedback on performance.

Exelon’s current method and standard for reactivating LSRO licenses may not meet the rule. This issue has been forwarded to the Office of Nuclear Reactor Regulation (NRR) for further guidance and clarification and will be treated as an unresolved item pending NRR’s disposition. **(URI 50-352; 353/02-04-01)** If Exelon’s methods and standards used at Limerick and Peach Bottom to re-activate a LSRO license do not meet the requirements of 10 CFR 55.53(f)(2) this would constitute a performance deficiency. Additionally if this finding is substantiated, this finding would be considered more than minor since use of inappropriately activated LSROs could be a precursor to operator errors which, in turn, could potentially lead to a significant event.

1R12 Maintenance Rule Implementation (71111.12)

a. Inspection Scope

The inspectors evaluated the follow-up actions for selected system, structure, or component (SSC) issues and reviewed the performance history of these SSCs to assess the effectiveness of Exelon's maintenance activities. The inspectors reviewed Exelon's problem identification and resolution actions, as applicable, for these issues to evaluate whether Exelon had appropriately monitored, evaluated, and dispositioned the issues in accordance with Exelon’s procedures and the requirements of 10 CFR 50.65(a)(1) and (a)(2), "Requirements for Monitoring the Effectiveness of Maintenance." In addition, the inspectors reviewed selected SSC classification, performance criteria and goals. The inspectors reviewed the associated maintenance action requests and discussed the issues with engineering personnel. The following issues were reviewed:

- (A1367613) “B” Main Control Room Chiller Trip
- (A1370590) Unit 2 Turbine Main Stop Valve #2 - a limit switch arm separated

b. 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:

- Reactor Core Isolation Cooling System Outage
- High Pressure Coolant Injection System Outage
- 2 “B” Residual Heat Removal System Outage
- Unit 1 Reactor Core Isolation Cooling and High Pressure Coolant Injection High Energy Line Break Blowout Panels Opened Simultaneously (CR 112419, Multiple Barriers Open in 309 Room - NRC Identified)

b. Findings

No findings of significance were identified.

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

.1 Unit 1 Reactor Scram

a. The inspectors observed operator actions and post-scram review activities following an automatic reactor shutdown (scram) on May 19. The scram occurred due to a main turbine trip caused by actuation of the thrust bearing wear detector during quarterly surveillance testing. The inspectors discussed the event with operators and operations management. The following documents were reviewed:

- GP-18, Scram/ATWS Event Review
- Condition Reports 108699, 108701, and 113822
- Action Requests A1369598, A1369569, A1375101
- PORC Summary Document “Unit 1 Turbine Trip on 5/19/02"
- Work Order R0844859

b. Findings

Introduction

The inspector identified a finding of very low safety significance (Green) that is also a non-cited violation of Technical Specification 6.8.1, “Procedures.” Exelon did not follow post scram station procedures during the investigation of the cause of an unexpected high reactor water level condition that led to the trip of all three reactor feedwater pumps following a Unit 1 scram on May 19, 2002. Exelon’s post scram review did not identify that the level control setpoint setdown function of the feedwater control system did not actuate which caused the unexpected high reactor water level condition.

Description

On May 19, 2002, following a Unit 1 turbine trip and reactor scram, the reactor water level unexpectedly exceeded the high-level trip point for the reactor feed pumps. This resulted in a temporary loss of feedwater and complicated the post-trip response.

Exelon’s post-scram review activities did not identify the cause of the high reactor water level condition. Although Exelon initially attributed a failure of the “A” feed pump discharge valve to close as the cause of the high reactor water level condition, Exelon eliminated this cause and did not perform any additional review. Procedure GP-18, “Scram/ATWS Event Review” states that the reviewer should “list any action that occurred (workarounds, challenges, level ringing) . . . and assign condition report assignments for evaluation.” The procedure also directs personnel to review unexpected or unusual response following a scram. Neither of these steps, as implemented, led to an adequate investigation of the cause of the high level condition.

In response to NRC questions on post-scram data during the week of June 24, Exelon determined that the high reactor water level condition occurred because the level control setpoint setdown function of the feedwater control system did not actuate. Exelon found a wiring error that was likely introduced during the March 2002 refueling outage. This function is designed to provide the feedwater control system with a lower-than-normal level setpoint, following a scram, to prevent a high water level condition. Exelon restarted the unit on May 22, 2002, unaware that the wiring error existed for the level control setpoint setdown function.

Analysis

Exelon's failure to properly investigate the cause of the reactor high water level condition following the scram on May 19, 2002, is a performance deficiency since station personnel did not adequately implement station procedure requirements regarding post scram review. 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 was associated with an attribute of the mitigating systems cornerstone and affected the cornerstone objective. The specific attribute was human performance (human error - post-event) and affected the cornerstone objective in that the failure of the setpoint setdown function of the feedwater control system did not ensure the availability and reliability of the power conversion system to respond to initiating events to prevent undesirable consequences. Exelon's failure to properly investigate the cause of the reactor high water level condition was determined to have very low safety significance (Green) using a Phase 3 analysis.

Phase 1 of the At-Power Reactor Safety Significance Determination Process (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. The assumptions made in the Phase 2 analysis were as follows.

- With the feedwater control system level control setpoint setdown function unavailable, the feedwater pumps would trip on high vessel level following a reactor scram. Therefore, the feedwater aspect of the primary conversion system was not credited in the analysis.

- An exposure time of greater than 30 days was used in the analysis.

- Recovery credit was assumed because sufficient time was available for the operators to manually recover the feedwater pumps using S06.1.D, "Post Scram Level Control"; operators had been trained on this procedure in both the initial licensing and requalification training programs; environmental conditions did not adversely impact these recovery actions; and no special equipment was needed to perform these recovery actions.

A review of the Phase 2 results indicated that they were conservative for two reasons. First, the Phase 2 SDP only allows a recovery credit of 1, which was conservative by at least one order of magnitude for this case. Second, the Phase 2 SDP worksheets assigned a credit of 2 for the human error probability for depressurization based on generic industry information. The Limerick SPAR Model, Rev 3i, and the licensee's PRA used a value of 5E-4, which equates to a credit of 3. Therefore, a Phase 3 analysis of this finding was determined to be appropriate.

The Phase 2 SDP framework was used for the Phase 3 analysis because it identified the appropriate dominant accident sequences. The Phase 3 analysis consisted only of refinement of recovery credit. The credit for depressurization, which was based on generic industry information, was not changed in the Phase 3 analysis because it was conservative and it did not impact the results.

The licensee's PRA modeled operator recovery of feedwater given its failure to remain in service following a transient. The recovery failure probability was 1.4E-2, which corresponded to an operator recovery credit of 2 when using the Phase 2 worksheets. This value was conservative because it modeled more recovery actions than would be necessary to recover tripped feedwater pumps as a result of high vessel water level. This value was also conservative in comparison with the recovery failure probability of 2.0E-3 calculated using the Accident Sequence Precursor (ASP) Human Reliability Analysis (HRA) methodology. Because the value used in the licensee's PRA was approximately one order of magnitude more conservative than the value calculated using the ASP HRA methodology, it was used in the Phase 3 analysis.

After application of the refined operator recovery credit, the dominant accident sequence involved a transient initiating event, failure of the power conversion system, failure of high pressure injection, failure to depressurize, and failure of the operators to recover the feedwater pumps. The increase in core damage frequency of the finding due to internal initiating events was greater than 1.0E-7, but less than 1.0E-6. The risk significance of the finding due to fire and seismic initiating events was negligible because the licensee did not credit the feedwater system in mitigating these initiating events in their Individual Plant Examination of External Events (IPEEE). In addition, the increase in large early release frequency of the finding was less than 1.0E-7. Therefore, the feedwater control system level control setpoint setdown function being unavailable for greater than 30 days was very low risk (Green).

Enforcement

Technical Specification 6.8.1 requires, in part, that written procedures be established, implemented, and maintained 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 reactor trips (scrams). Exelon Procedure GP-18, "Scram/ATWS Event Review," states, in part, that the reviewer should "list any action that occurred (workarounds, challenges, level ringing) . . . and assign condition report assignments for evaluation." Also, the procedure directs personnel to review unexpected or unusual response following a scram. Contrary to the above Exelon's post scram actions did not adequately investigate the cause of the high level condition following the scram on May 19, 2002. The failure to properly implement Exelon Procedures GP-18 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) 113822. **(NCV 50-352/02-04-02)**

.2 Unit 1 Unplanned Operational Condition (OPCON) Change

a. Inspection Scope

The inspectors observed and reviewed licensed operator performance in the control room following to an unplanned mode (operational condition) change on May 21, 2002. The inspectors reviewed reactor coolant temperature data, operator logs, maintenance action requests, and compliance with technical specifications and applicable procedures. The inspectors also discussed this event with operations and engineering personnel. The following documents were reviewed:

- Prompt Investigation - Entry into OPCON 3 During Unit 1 Startup (CR108974)
- ST-6-107-640-1, Reactor Vessel Temperature and Pressure Monitoring
- Action Requests A1361478, A1374296, A1269339
- Exelon Procedure OP-AA-108-105, "Equipment Deficiency Identification and Documentation"
- LS-AA-105-1000, "Operability Determination Guidance Manual"

b. Findings

Introduction

The inspector identified a finding of very low safety significance (Green) that is also a non-cited violation of Technical Specification 6.8.1, "Procedures." Exelon did not assess the operational impact of a degraded '1A' recirculation loop temperature instrument. Consequently, when operators used this degraded temperature instrument to monitor coolant temperature while in a Cold Shutdown condition, the operators did not recognize, due to erroneous temperature indication by the degraded instrument, that the actual reactor coolant temperature had exceeded 200 degrees and resulted in an inadvertent operational condition change to a Hot Shutdown condition.

Description

On May 21, 2002, during a Unit 1 forced outage, an unplanned change from Cold Shutdown to Hot Shutdown occurred after the RHR shutdown cooling system was secured. Although the '1A' recirculation loop temperature instrument being used by the operators to monitor reactor coolant temperature indicated less than 200°F, other reactor coolant temperature instruments indicated that reactor coolant temperatures exceeded 200°F. Prior to this date, Exelon recognized that this temperature instrument had been reading low. Exelon did not fully evaluate the low reading condition of this instrument for operator use on a heat-up/cool-down surveillance test procedure and a recirculation pump start surveillance test, both of which are required to verify compliance with technical specifications.

Exelon did not recognize the low reading condition of this instrument as a main control room deficiency and did not consider other actions, such as requesting engineering evaluation of the low reading condition or using alternate temperature instruments for monitoring reactor coolant temperature in surveillance test procedures. Exelon Procedure OP-AA-108-105 requires shift management to analyze deficiencies, particularly those involving main control room instrumentation for impact on the full range of operational possibilities.

The operators believed that the instrument read approximately 20 degrees lower than actual temperature and they mentally added the 20 degrees after recording the indicated temperature on surveillance test sheets. However, post-event review of the temperature instrument data showed that the actual temperature error was greater than 20 degrees when reactor coolant temperature was above 150 degrees.

Analysis

Exelon's failure to assess the degraded condition of the '1A' recirculation loop temperature instrument is a performance deficiency because station personnel did not comply with station procedure requirements to fully analyze degraded main control room indications. 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. The finding was considered more than minor in that it was associated with one of the attributes of the Initiating Events cornerstone and affected the cornerstone objective. Specifically it affected the attribute associated with equipment performance reliability (recirculation loop temperature instrument) and affected the objective of this cornerstone to limit the likelihood of events that upset plant stability. This finding was determined to be of very low safety significance (Green) by the Reactor Inspection Findings for At-Power Situations because it did not increase the likelihood of a primary system LOCA, did not contribute to the likelihood of a reactor trip, and did not increase the likelihood of a fire or internal/external flood.

Enforcement

Technical Specification 6.8.1 requires, in part, that written procedures be established, implemented, and maintained 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 the control of maintenance. The maintenance work control process includes the identification of equipment deficiencies for maintenance, as described by Exelon Procedure OP-AA-108-105, "Equipment Deficiency Identification and Documentation." OP-AA-108-105 states, in part, that "shift management is responsible for determining which equipment deficiencies are main control room deficiencies (critical and non-critical). Shift management ensures deficiencies are analyzed, individually and collectively, for impact on the full range of operational possibilities . . . particular care must be taken when evaluating main control room instrumentation and indications." Contrary to the above, on May 21, 2002, Exelon did not adequately evaluate the degraded '1A' recirculation loop temperature instrument over the full range of operational possibilities, in that the degraded instrument did not provide adequate information on reactor coolant temperature to prevent an unplanned change from a Cold Shutdown to a Hot Shutdown condition. The failure to implement OP-AA-108-105 for the 'A' recirculation loop temperature instrument is being treated as a Non-Cited Violation (NCV), consistent with Section VI.A. of the NRC Enforcement Policy. This issue is documented in Condition Report (CR) 108974. **(NCV 50-352/02-04-03)**

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, Updated Final Safety Analysis Report (UFSAR), associated design basis documents, and applicable action request and condition report documents during these reviews. The issue(s) reviewed included:

- (A1372951) Emergency Service Water "A" Discharge to an RHR Service Water Return Valve (HV-011-015A) Failed to Close
- (A1361478) 'A' Recirculation Loop Temperature Instrument
- (A1370399) 1 "E" Safety Relief Valve Leakage
- (A1315574) 2 "H" Safety Relief Valve Leakage

b. Findings

No findings of significance were identified. Section 1R14 addresses operator performance issues related to the 'A' recirculation loop temperature instrument.

1R19 Post Maintenance Testing (71111.19)

a. Inspection Scope

The inspectors observed portions of post-maintenance testing activities in the field to determine whether the tests were performed in accordance with the approved procedures. The inspectors assessed the test's adequacy by comparing the test methodology to the scope of maintenance work performed. In addition, the inspectors evaluated the test acceptance criteria to verify whether the test demonstrated that the tested components satisfied the applicable design and licensing bases and the technical specification requirements. The inspectors reviewed the recorded test data to determine whether the acceptance criteria were satisfied. The maintenance activities reviewed included:

- Unit 1 Reactor Core Isolation Cooling system maintenance
- Unit 2 High Pressure Coolant Injection system maintenance
- 2 "B" Residual Heat Removal system maintenance
- Emergency Service Water "A" Discharge to a Residual Heat Removal Service Water Return Valve (HV-011-015A) Troubleshooting/inspection/torque Switch Check

The inspectors referred to testing procedures and work order documents, including:

- C0201685
- ST-6-107-200-0, IST Valve Stroke Surveillance Log

b. Findings

No findings of significance were identified.

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-6-051-232-2, 2 "B" Residual Heat Removal Pump Valve and Flow Test
- ST-2-049-100-1, Unit 1 Reactor Core Isolation Cooling Logic System Functional Test
- ST-2-055-100-1, Unit 1 High Pressure Coolant Injection Logic System Functional Test

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES [OA]

4OA2 Identification and Resolution of Problems

The Green Finding associated with Exelon's failure to properly investigate the cause of an unexpected high reactor water level condition, as discussed in Section 1R14 of this report, has a Problem Identification and Resolution cross-cutting aspect. Exelon did not enter the high reactor level issue in the corrective action program and thereby missed opportunities to identify the cause.

4OA3 Event Followup (71153)

.1 Section 1R14 describes NRC event followup for a Unit 1 reactor scram that occurred on May 19, 2002.

.2 LER 1-02-001

Unit 1, Inoperable Safeguard Battery Charger Resulted in a Condition Prohibited by Technical Specifications. The inspectors reviewed this event in NRC Inspection Report 50-352;353/02-02, and documented two licensee-identified non-cited violations. Exelon placed this event in the corrective action program as CR 100013. The apparent cause was a failure to identify unsatisfactory surveillance test results. No new findings of significance were identified during the inspector's onsite review. This LER is closed.

.3 LER 1-02-002

Units 1 and 2, Inoperable Core Spray Header Differential Pressure Alarm Resulted in a Condition Prohibited by Technical Specifications. The inspectors reviewed the LER and identified no findings of significance. This issue is documented in the Exelon corrective action program as CR 101101. It constituted a violation of minor significance that is not subject to enforcement action in accordance with Section VI of the NRC Enforcement Policy. This LER is closed.

4OA6 Meetings, Including Exit

.1 Exit Meetings

The inspectors presented the inspection results to Mr. Levis and other members of station management on July 3, 2002.

The inspector for the Limited Senior Reactor Operator (LSRO) Requalification Program for Fuel Handlers presented the inspection results to members of Exelon management on May 22, 2002.

The inspectors asked Exelon whether any materials examined during the inspections should be considered proprietary. No proprietary information was identified.

ATTACHMENT 1

SUPPLEMENTAL INFORMATION

a. Key Points of Contact

Exelon Generation Company

R. Braun	Plant Manager
E. Callan	Director - Maintenance
W. Levis	Site Vice President
C. Mudrick	Director - Engineering
W. O'Malley	Director - Operations
J. Tucker	Senior Manager - Plant Engineering

b. List of Items Opened, Closed, and Discussed

Opened

URI 50-352;353/02-04-01	Methods and standards for reactivating LSRO licenses (Section 1R11)

Closed

LER 1-02-001	Unit 1 inoperable safeguard battery charger discovered during review of completed surveillance test. (Section 40A3)
LER 1-02-002	Units 1 and 2, inoperable core spray internal line break alarm due to instrument zero offset change. (Section 40A3)

Opened and Closed

NCV 50-352/02-04-02	Failure to fully implement station procedure requirements for post-scram reviews. (Section 1R14)
NCV 50-352/02-04-03	Failure to follow station procedures for analyzing degraded main control room indications. (Section 1R14)

c. List of Documents Reviewed

As listed in report.

d. List of Acronyms

CFR	Code of Federal Regulations
JPM	job performance measures
LER	Licensee Event Report
LCO	Limiting Condition for Operation
LSRO	Limited Senior Reactor Operator
NCV	Non-cited Violation
NRC	Nuclear Regulatory Commission
NRR	Nuclear Reactor Regulation
OPCON	operational condition
PIM	plant issues matrix
RHR	residual heat removal system
SDP	Significance Determination Process
SRO	senior reactor operator
SSC	system, structure, or component
UFSAR	Updated Final Safety Analysis Report