

January 31, 2003

Mr. John L. Skolds, President  
Exelon Nuclear  
Exelon Generation Company, LLC  
Quad Cities Nuclear Power Station  
4300 Winfield Road  
Warrenville, IL 60555

SUBJECT: QUAD CITIES NUCLEAR POWER STATION  
NRC INTEGRATED INSPECTION REPORT 50-254/03-02; 50-265/03-02

Dear Mr. Skolds:

On December 20, 2002, the Nuclear Regulatory Commission (NRC) completed an inspection at your Quad Cities Station, Units 1 and 2. The enclosed report documents the inspection findings which were discussed on December 20, 2002, with Mr. Tulon and other members of your staff.

This inspection was an examination of activities conducted under your license as they relate to the identification and resolution of problems, compliance with the Commission's rules and regulations and with the conditions of your operating license. Within these areas, the inspection involved selected examination of procedures and representative records, observation of activities, and interviews with personnel.

On the basis of the sample selected for review, the inspectors concluded that, in general, problems were being properly identified, evaluated, and corrected. However, the inspectors made several observations regarding the effectiveness of problem identification and resolution program implementation. For example, the inspectors identified several examples where a narrow focus led to problems not being identified prior to them "self-identifying" in the form of a broken component and reactor trip. Similarly, the inspectors noted a number of examples of narrowly focused problem evaluations. These examples tended to be non-routine and involved multiple organizations and layers of management. On the positive side, the inspectors noted that Nuclear Oversight appeared to be an effective source for identifying performance issues and that plant employees, in general, indicated a strong willingness to report problems "to the highest levels." The inspectors concluded that the corrective action program was generally effective in ensuring that conditions adverse to quality were being adequately addressed.

There were two Green findings identified during this inspection, one of which involved a violation of NRC requirements. The first finding involved the slow identification of vibration issues on Unit 2, which resulted in a non-safety-related main steam drain line breaking. The second finding, which involved a violation of NRC requirements, involved the failure to effectively resolve engineering issues identified in NRC inspections. However, because this violation was of very low safety significance and because the issues have been entered into

your corrective action program, the NRC is treating this finding as a Non-Cited Violation, in accordance with Section VI.A.1 of the NRC's Enforcement Policy. If you deny this Non-Cited Violation, 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, Washington, DC 20555-0001, with copies to the Regional Administrator, Region III; the Director, Office of Enforcement, Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Quad Cities Station.

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 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/*

David E. Hills, Chief  
Mechanical Engineering Branch  
Division of Reactor Safety

Docket Nos. 50-254; 50-265  
License Nos. DPR-29; DPR-30

Enclosure: Inspection Report 50-254/03-02;  
50-265/03-02

See Attached Distribution

cc w/encl: Site Vice President - Quad Cities Nuclear Power Station  
Quad Cities Nuclear Power Station Plant Manager  
Regulatory Assurance Manager - Quad Cities  
Chief Operating Officer  
Senior Vice President - Nuclear Services  
Senior Vice President - Mid-West Regional  
Operating Group  
Vice President - Mid-West Operations Support  
Vice President - Licensing and Regulatory Affairs  
Director Licensing - Mid-West Regional  
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Manager Licensing - Dresden and Quad Cities  
Senior Counsel, Nuclear, Mid-West Regional  
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Document Control Desk - Licensing  
Vice President - Law and Regulatory Affairs  
Mid American Energy Company  
M. Aguilar, Assistant Attorney General  
Illinois Department of Nuclear Safety  
State Liaison Officer, State of Illinois  
State Liaison Officer, State of Iowa  
Chairman, Illinois Commerce Commission  
W. Leach, Manager of Nuclear  
MidAmerican Energy Company

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cc w/encl: Site Vice President - Quad Cities Nuclear Power Station  
Quad Cities Nuclear Power Station Plant Manager  
Regulatory Assurance Manager - Quad Cities  
Chief Operating Officer  
Senior Vice President - Nuclear Services  
Senior Vice President - Mid-West Regional  
Operating Group  
Vice President - Mid-West Operations Support  
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Mid American Energy Company  
M. Aguilar, Assistant Attorney General  
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U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos: 50-254; 50-265  
License Nos: DPR-29; DPR-30

Report No: 50-254/03-02; 50-265/03-02

Licensee: Exelon Generation Company, LLC

Facility: Quad Cities Station, Units 1 and 2

Location: 22710 206th Avenue North  
Cordova, IL 61242

Dates: December 2 through 20, 2002

Inspectors: P. Lougheed, Senior Engineering Inspector, Lead  
K. Stoedter, Senior Resident Inspector  
J. Neurauter, Engineering Inspector  
R. Lerch, Project Engineer  
T. Bilik, Inspector in Training  
H. Gonzalez, Inspector in Training

Approved by: David E. Hills, Chief  
Mechanical Engineering Branch  
Division of Reactor Safety

## SUMMARY OF FINDINGS

IR 05000254-03-02; 05000265-03-02; Exelon Generation Company, LLC; on 12/02-20/2002, Quad Cities Station; Units 1 & 2. Biennial Identification and Resolution of Problems

The inspection was conducted by regional and resident inspectors. Two Green findings of very low safety significance were identified during this inspection, one of which was classified as a Non-Cited violation. Both findings were evaluated using the significance determination process. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter 0609, "Significance Determination Process." Findings for which the Significance Determination Process 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.

### Identification and Resolution of Problems

Although issues were generally entered into the corrective action process at an appropriate level, there were times when opportunities to identify issues were missed due to a narrow focus. This led to issues either being self-revealing or being identified by outside organizations. Several of these issues resulted in plant shutdowns. Minor issues were generally properly categorized and evaluated. However, there were a number of examples where it appeared that the initial evaluation was limited and narrowly focused. These examples tended to be non-routine and involved multiple organizations and layers of management. In general, the licensee effectively corrected plant problems. On the positive side, the inspectors noted that Nuclear Oversight appeared to be an effective source for identifying performance issues and that plant employees, in general, indicated a strong willingness to report problems "to the highest levels." The inspectors concluded that corrective action program was generally effective in ensuring that conditions adverse to quality were being adequately addressed.

### Cornerstone: Initiating Events

Green. The inspectors identified a Green finding due to the licensee's failure to recognize and address high vibration indications on plant equipment. On April 2, 2002, a Unit 2 main steam drain line broke due to high vibrations. The pipe break occurred down stream of the main steam isolation valves in a non-safety-related portion of the main steam piping.

The issue was more than minor, in that if the vibrations were not corrected (on both units) they could become a more significant safety concern. However, due to the location of the actual break, the issue was determined to be of very low safety significance. This issue was not subject to NRC enforcement since the break occurred in a non-safety-related portion of the main steam line and did not impact the operation of safety-related equipment (Section 40A2.1.b1).

## **Cornerstone: Mitigating Systems**

Green. The inspectors identified a Green Non-Cited Violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," related to the quality of design basis engineering calculations. Specifically, the inspectors identified that instrument and test uncertainty was not considered in a number of design calculations, such that the calculation acceptance limits could not be validated. The diesel generator cooling water (DGCW), high pressure coolant injection (HPCI), and reactor core isolation cooling (RCIC) system design bases were not being adequately controlled by existing calculations.

This finding was considered greater than minor because a loss of design control could affect the reliability of the DGCW, HPCI and RCIC systems to perform their safety functions. Because no operability concerns were identified, the issue was determined to be of very low safety significance (Section 4OA2.3.b1).



## REPORT DETAILS

### 4. OTHER ACTIVITIES (OA)

#### 4OA2 Problem Identification and Resolution

##### .1 Effectiveness of Problem Identification

###### a. Inspection Scope

Prior to beginning the inspection, the inspectors reviewed previous inspection reports to determine if any of the seven cornerstones required further review in the area of problem identification and resolution. The inspectors reviewed a list of approximately 1650 condition reports looking for possible trends and selected a number of condition reports for detailed review. The problem identification program was also evaluated by reviewing issues identified in previous NRC inspections, corrective action program documents and records, and by discussing the program with licensee personnel, which included management and supervision as well as engineers and craftsmen. The inspectors reviewed Nuclear Oversight assessments and compared them to the offsite Nuclear Safety Review Board assessments. The inspectors also conducted a focused plant walkdown of the feedwater and high pressure coolant injection systems to ensure that equipment problems were entered into the corrective action system. The documents reviewed are listed at the end of the report.

###### b. Issues and Findings

###### b.1 Unit 2 Main Steam Drain Line Break

The inspectors identified a Green finding due to the licensee's failure to recognize and address high vibration indications on plant equipment. On April 2, 2002, a Unit 2 main steam drain line on broke due to high vibrations. The pipe break occurred down stream of the main steam isolation valves in a non-safety-related portion of the main steam piping. The licensee wrote condition report 102091 to document this condition.

The drain line broke nine hours after the licensee had started up from a forced shutdown to repair leaks in the turbine electro-hydraulic control system caused by high vibrations. In its root cause evaluation of the main steam drain line break, the licensee noted that they had earlier indication of excessive vibration on the main steam line, including the fact that insulation and vibration monitors were falling off the main steam piping (condition reports 94841 and 98412) and failed to recognize the impact of the high vibration on the small bore piping. The inspectors noted that, in addition to the electro-hydraulic control system leaks and the steam drain line break, Unit 2 also had feedpump drain line failures which caused power reductions.

During the inspection, the licensee identified excessive vibration on a local leak rate test line for the Unit 1 high pressure coolant injection system. The licensee wrote condition report 135466, and cut and welded the test line. Also during this time period, Unit 1 experienced a leak on a feedpump drain line. The welds on this drain line had been

reinforced during the Unit 1 refueling outage due to the problems experienced on Unit 2; however, the reinforcement failed to prevent the failure from occurring. The licensee wrote condition report 134191 for this failure. Towards the end of the inspection, the Unit 1 safety relief valves were experiencing vibration and the licensee was evaluating the issue.

The inspectors determined that a performance deficiency existed in regard to the main steam line drain pipe break. The inspectors concluded this issue was more than minor, in that if the vibrations were not corrected (on both units) the finding could become a more significant safety concern. The inspectors determined that the issue could be evaluated under the significance determination process because it increased the probability of an initiating event. The inspectors evaluated the issue under Phase 1 of the significance determination process and determined that the issue screened as Green due to the location of the actual break. This issue was not subject to NRC enforcement since the break occurred in a non-safety-related portion of the main steam line and did not impact the operation of safety-related equipment (FIN 50-254,265/03-02-01).

## b.2 Problem Identification Overview

In general, the plant identified issues and entered them into the corrective action process at an appropriate level. Due to Exelon considering the corrective maintenance process a "separate but equal" part of the corrective action process, some low level equipment issues were entered only into the corrective maintenance process, while some were entered into both systems. This dichotomy in handling issues which fell under the requirements of the licensee's 10 CFR Part 50 Appendix B Quality Assurance Program did not apply to issues outside NRC's jurisdiction, such as occupational injuries or missed training. These issues were all tracked as part of the corrective action process.

In August 2001, the licensee underwent a substantial shift in the corrective action process, going to a computer based initiation system which was cumbersome and non-user-friendly. This resulted in a drop in the number of condition reports generated for a several month period. In June 2002, the licensee unrolled a web-based reporting system which was more user friendly and made identification of issues much easier. However, this program required use of an individual's social security number to initiate a condition report, making it extremely difficult to provide an anonymous condition report. Paper copies of the condition report initiation forms were available, however, not all individuals were aware of them.

Departmental self-assessments were performed at an acceptable level. Departmental self-assessments were done on a quarterly basis, and programmatic assessments were done when deemed necessary by the station. Nuclear Oversight appeared to be extremely active and identified a substantial number of issues for the station to resolve.

### b.3 Examples of Narrowly Focused Identification

Although issues were generally entered into the corrective action process at an appropriate level, there were times when opportunities to identify issues were missed due to a narrow focus. This led to issues either being self-revealing or being identified by outside organizations, as described below.

Jet Pump Beam Crack: On January 9, 2002, a jet pump holddown beam in the Unit 1 reactor failed, causing a plant shutdown. This event is described in Inspection Report 50-254,265/02-03. As part of its root cause investigation into the jet pump holddown beam failure, the licensee reviewed the tape made during the 1998 Unit 1 refueling outage of the jet pump holddown beam inspections. During this review, the licensee discovered that the crack, which caused the 2002 holddown beam failure, was visible on the 1998 tape. The licensee determined that it was not reasonable for the personnel viewing the tape to have identified the crack, because it was outside the areas required to be inspected by the Boiling Water Reactor Vessel Internals Project (BWRVIP) guideline, BWRVIP-41, "BWR Jet Pump Assembly Inspection and Flaw Evaluations." During the problem identification and resolution inspection, the inspectors viewed the tape. While the inspectors agreed that the crack was outside the areas required to be examined by BWRVIP-41, the inspectors noted that the crack was visible on several occasions. On one occasion, the crack was visible for several seconds in the upper right portion of the screen in a magnified camera shot. The inspectors considered the failure to identify the crack as a missed opportunity for the licensee. The initial reviewers appeared to have narrowly focused on only those areas required to be inspected rather than a broader view to ensure that cracks were not propagating elsewhere in the holddown beams.

Motor Overgreasing: Another example where the licensee took a narrow focus on identifying problems is described in Inspection Report 50-254,265/02-07. In this report, the inspectors identified one Green finding and an associated Non-Cited Violation due to the failure to identify and evaluate a potential overgreasing condition on risk significant plant motors in a timely manner. This failure to act resulted in the licensee operating multiple potentially degraded plant motors for more than 40 days without providing a basis for continued operability.

Hydraulic Control Unit Hose Clamps: In February 2002, the licensee received an operating experience report from Oyster Creek Station regarding missing control rod drive hydraulic control unit clamps. On March 7, 2002, the Quad Cities resident inspectors learned that similar problems were identified at Dresden. The inspectors then questioned what actions were taken at Quad Cities and determined: (1) the basis for continued operability was not documented; (2) the operability conclusion was based upon a regulatory assurance individual's judgement rather than an actual walkdown of the hydraulic control units; and (3) that the regulatory assurance individual did not recognize the need to address the operating experience report prior to Unit 2 restarting from its refueling outage to prevent operation of the unit with inoperable hydraulic control units (a condition prohibited by technical specifications). Also, on March 7, the engineers conducted immediate walkdowns of the hydraulic control units to look for missing or inadequate hose clamps; however they did not inform shift management of the results. The engineers identified that two hydraulic control units on both units either

had hose clamps installed instead of the required steel seismic clamps or were missing clamps. The inadequate or missing clamps were immediately replaced with the appropriate steel clamps. Engineering personnel also completed an appropriate operability evaluation and determined that the four deficient hydraulic control units remained operable even though the appropriate clamps were not previously installed.

Scaffolding and Foreign Material Exclusion Issues During Unit 1 Outage: During the November 2002 Unit 1 refueling outage, the resident inspectors identified multiple examples of erected scaffolding in contact with both safety-related and non-safety-related systems (see Inspection Report 02-08). The inspectors notified licensee personnel each time they identified an example of deficient scaffold erection and the licensee took timely action to address each scaffold erection issue. However, condition reports were not written for any of the inspector identified issues. After several discussions regarding scaffold erection deficiencies during the resident inspectors' weekly management debriefs, licensee management initiated condition report 131690 on November 14 to document the inspector identified issues and to determine whether a common cause existed.

During the same refueling outage, the resident inspectors identified examples of weak foreign material exclusion control in the drywell. Each time the inspectors identified a foreign material exclusion issue, it was immediately communicated to licensee personnel. Although the licensee corrected the concerns, the issues were not documented in the corrective action program. The inspectors reviewed the condition report database and found five examples of weak foreign material exclusion control which had been entered into the corrective action process. In addition, the nuclear oversight department identified foreign material exclusion controls as a concern as part of their rapid trending report during the first five days of the refueling outage. The resident inspectors questioned licensee management to determine why condition reports were not written for the inspector identified issues. The licensee was unable to provide a reason for the lack of a condition report. Regulatory assurance management initiated condition report 131697 to document the inspector identified issues and the potential that drywell foreign material exclusion controls were not adequate.

Small Bore Piping Vibrations: This issue is discussed in detail in Section 4.1.b.1 above.

## .2 Prioritization and Evaluation of Issues

### a. Inspection Scope

The inspectors reviewed past inspection results, selected condition reports, root cause reports, and apparent cause evaluations to evaluate the licensee's ability to effectively prioritize and evaluate plant issues documented in the corrective action program. The inspectors focused on corrective action documents relating to risk significant systems. The inspectors also attended several meetings during which the condition reports were collegially screened and assigned a significance level as well as several management review board meetings which provided a management review of condition reports. The documents reviewed are listed at the end of the report.

b. Issues

b.1 Prioritization and Evaluation Overview

There were no findings in regard to prioritization or evaluation of issues. Minor issues were generally properly categorized and evaluated. The licensee appeared to rely heavily upon both the collegial "CAPCO" [corrective action program coordinator] daily review and the senior management review to ensure that issues received the proper prioritization and evaluation; this level of review did not appear to be applied equally to low level items in the corrective maintenance process. The inspectors noted that the licensee routinely put items "on hold" to return to either the originator or the supervisor for additional information, a process that was informally tracked by a clerk and was not part of the licensee's official corrective action trending program.

Senior managers had the option of requesting that the results of apparent cause evaluations be reported back to them; those evaluations that were reported back to senior management tended to be of higher quality than those that were not. This observation had also been made by the licensee and the licensee planned further actions to improve the quality of apparent cause evaluations. Root cause evaluations were generally acceptable.

b.2 Examples of Inefficacious Evaluations

The inspectors identified a number of examples where it appeared that the initial evaluation was limited and narrowly focused. These examples tended to be non-routine and involved multiple organizations and layers of management. A short description is provided below:

Recirculation Pump Capacitance: On December 6, 2002, the licensee experienced a trip of the 1B reactor recirculation pump due to voltage regulator instabilities (see Inspection Report 02-08). The inspectors reviewed the condition report database and identified that the 1B reactor recirculation motor generator set failed to meet the specified acceptance criteria during voltage regulator tuning on November 29 and December 3. The licensee initiated condition reports 133549 and 133856 to document the failure to meet the specified acceptance criteria. The inspectors determined that the licensee's evaluation of these condition reports was limited and lacked rigor. For example, the operating characteristics of the voltage regulator were compared to similar information from February – November 2002. However, the licensee did not consider the potential that previous and current voltage regulator operating characteristics were different due to stability and gain potentiometer adjustments made during the refueling outage. Following two 1B reactor recirculation pump trips in November 2000, the licensee established corrective actions to provide engineering training on voltage regulator operation in order to prevent recurring pump trips. The inspectors determined that the less than rigorous evaluation, and the ineffective corrective actions from previous pump trips, resulted in an additional pump trip which caused a significant transient (greater than 20 percent power change) on Unit 1. While the licensee was aware of the potential for the 1B reactor recirculation pump to trip, appropriate actions were not taken to minimize this potential. This issue was not subject to NRC enforcement since the reactor recirculation pump and associated motor generator and

voltage regulator are non-safety-related components and the resulting recirculation pump trip did not impact the operation of safety-related equipment.

Dry Chemical Release in Unit 1 Drywell: On November 12, 2002, the licensee experienced a small fire in the Unit 1 drywell due to welding residue igniting a small rag. A dry chemical fire extinguisher was used to put the fire out. The licensee initiated condition report 131942 to document the fire. Prior to Unit 1 startup, the inspectors requested a copy of the evaluation documenting the potential interactions between dry chemical residue and plant equipment. The inspectors were informed orally that all dry chemical residue in the drywell had been cleaned up. However, this information was not documented in an evaluation or as part of the resolution of condition report 131942. Between November 12 and December 3, the inspectors questioned licensee management regarding the dry chemical evaluation on a weekly basis. In early December the licensee initiated condition report 133593 to address the NRC's concern regarding the lack of a documented evaluation. The inspectors reviewed the corrective actions for this condition report and noted that a formal evaluation was not due until February 14, 2003 (almost three months after startup). The inspectors questioned licensee management to determine how Unit 1 could have been allowed to startup without having an evaluation in place to assess the potential operability impacts due to dry chemical residue being left on plant components. Licensee management did not have an answer other than stating that the completion of the evaluation must have been dropped due to Unit 1 being in an outage and the completion of the evaluation not being assigned to a specific person. On December 19, the licensee provided a documented evaluation which determined that any dry chemical residue left in the drywell would have little to no impact on plant equipment.

Extinguished Panel Light: As discussed in Inspection Report 02-08, the licensee failed to fully understand the significance of an extinguished light during multiple performances of an instrument maintenance surveillance procedure which resulted in the failure to identify the 2B RHR system was inoperable and unable to start automatically for approximately seven months. This condition also would have resulted in water from the 2A RHR system being diverted through the 2B system if an automatic start signal was received while the 2B RHR system was in torus cooling. Although actions were taken to document the extinguished light on the surveillance procedure and in the corrective maintenance process, the rigor applied in trying to understand the significance of the extinguished light was less than adequate since the licensee believed, without verifying, that the light was for indication only and the cause of the light failure was not thoroughly evaluated for potential impact on equipment operability until a different surveillance test failed in October 2002.

Missing Lock Washer on Breaker Plungers: In May 2002, the licensee identified a failure to appropriately evaluate operating experience from Dresden Station. On September 6, 2001, licensee personnel received a operating experience report regarding a failure of a reactor recirculation pump discharge valve to close due to auxiliary contact plunger arm binding. Since very little information was available in the report, the electrical maintenance department reviewed the associated root cause report and determined that the auxiliary contact binding was due to inadequate procedures which failed to address the installation of a lock washer. Electrical maintenance personnel also determined that this issue was directly applicable to Quad Cities. Due to

the direct applicability, the electrical maintenance department conducted an extent of condition review and found nothing abnormal. Based upon this information, the licensee decided to replace the auxiliary contacts and install the lock washer during the routine preventive maintenance completed every five years.

On April 26, 2002, the licensee initiated condition report 105454 to document a General Electric Part 21 report regarding the potential for equipment failure due to missing auxiliary contact plunger post lock washers. The inspectors determined that the Part 21 report was generated based upon the previous event at Dresden Station. On May 7, engineering personnel performed a walkdown of safety-related auxiliary contacts and determined that approximately 20 percent were missing the lock washers. The licensee initiated condition report 107669 to document the inadequate electrical maintenance department extent of condition review in March 2002. The licensee determined that the extent of condition review was inadequate because the sample size was limited and the procedures used to perform the contact inspections had not been revised to include verification of the lock washer prior to the inspections. Operability of the auxiliary contacts with missing lock washers was addressed in operability evaluation 105454.

Steam Dryer: The inspectors evaluated the effectiveness of the licensee's evaluation in regard to the steam dryer failure. This event was described in 50-254,265/02-07. As stated in the inspection report, the licensee first identified problems in early June and determined the most likely cause was a degraded steam dryer. The licensee prepared an operability evaluation which concluded that continued operation was justified based on the unlikelihood that the dryer would disintegrate, or that if it did, that any loose parts could not move such that they would damage safety-related components. Over the next 30 days, the unit continued to experience low level plant transients which resulted in changes to reactor power, reactor pressure, reactor level, and steam flow. This continued until July 7, 2002, at which time the main steam line leakage alarm started coming in and out at a fairly frequent rate. On July 9, the alarm came in solid. On July 11, 2002, the licensee concluded that dryer pieces had entered the main steam line, and that they were not exactly sure where the pieces were. The licensee then shut the plant down.

Although considerable licensee and General Electric attention was devoted to this issue, the inspectors deemed that the licensee had reservations about abandoning the hypothesis that the dryer would remain in one piece, even after there was indication that plant parameters had significantly changed (i.e., the main steam line leakage alarm occurring on a much more frequent basis). It appeared that the licensee sought to understand how the data fit into the earlier hypothesis rather than evaluating the effects of the data on the plant. This appeared to result in a two to four day delay in the decision being reached that the plant was in Technical Specification 3.0.3 and an immediate shutdown was required.

Room Cooler Pipe Erosion: Another example where the licensee took a narrow focus on evaluating problems is described in Inspection Report 50-254,265/01-15. The licensee initially assumed pipe degradation seen in the residual heat removal service water system room coolers was caused by under deposit corrosion. When further leaks occurred, the licensee determined that the leakage was due to cavitation-induced

erosion due to a flow restricting orifice in the piping; however, the licensee failed to recognize the extent of the condition prior to the safety system design inspection.

Failure to Identify Maintenance Rule Preventative Function Failure: The inspectors evaluated an event described in Inspection Report 50-254,265/01-16 in regard to the problem identification and resolution aspects. On October 29, 2001, the resident inspectors reviewed condition report Q2001-01328 on repeat failures of the Unit 1 battery room ventilation system air handling unit drive belts. The inspectors determined that the licensee had not correctly characterized the belt failures as maintenance preventable functional failures due to the failure to understand the definition of "function" per the maintenance rule. After additional review, the licensee determined that multiple Unit 1 and 2 drive belt failures had not been properly evaluated under the maintenance rule. The subsequent evaluation of the drive belt failures resulted in the Unit 1 and 2 battery room ventilation systems being re-classified as maintenance rule (a)(1) systems.

### .3 Effectiveness of Corrective Actions

#### a. Inspection Scope

The inspectors reviewed corrective action documents and recent plant issues to determine if corrective actions were implemented in a timely, appropriate, and effective manner. The inspectors reviewed the licensee's corrective actions for Non-Cited Violations (NCVs) documented in NRC inspections in the past year. The inspectors also followed up on the problems with measuring and test equipment identified during the previous problem identification and resolution inspection. The documents reviewed are listed at the end of the report.

#### b. Findings and Issues

The inspectors had one finding and one observation in this area. In general, the inspectors found that the licensee effectively corrected plant problems. The inspectors' review of issues identified during the previous problem identification and resolution inspection determined that corrective actions for these issues appeared to be effective. The finding and the observation are discussed in the following paragraphs.

##### b.1. Calculation Control and Quality Finding

Introduction: The inspectors identified a Green NCV of 10 CFR Part 50, Appendix B, Criterion III, "Design Control" related to the quality of design basis engineering calculations. Specifically, the inspectors identified that instrument and test uncertainty was not considered in a number of design calculations, such that the calculation acceptance limits could not be validated. Although none of the specific deficiencies identified during the inspection resulted in immediate operability concerns, the inspectors concluded that the diesel generator cooling water (DGCW), high pressure coolant injection (HPCI) and reactor core isolation cooling (RCIC) system design bases were not being adequately controlled by existing calculations.



Discussion:

- In response to an issue raised in Inspection Report 50-254,265/01-15, the licensee issued condition report 113395. The operability determination associated with the condition report and design calculation QDC-1000-M-0131, "Net Positive Suction Head (NPSH) versus Requirements for DGCW and RHRSW Pumps," both used test data to calculate an equivalent pipe roughness factor for the pump suction piping. This factor was then used to show that the available pump NPSH was greater than or equal to the required NPSH for the maximum pump flow requirements. Neither the uncertainty in reading the test pressure gauge nor the inherent uncertainty in the flow instrumentation was taken into consideration in determining the pipe roughness factor. The inspector noted that there was little margin between the required and available NPSH for the DGCW and RHRSW pumps; therefore, changes to the roughness factor could impact the operation of the pumps. At the time of the inspection, no operability issues existed as lake temperatures were below the design maximum. Based on the inspectors' concerns, a calculation revision incorporating instrument uncertainty was being prepared. This preliminary evaluation demonstrated that NPSH available to the DGCW and RHRSW pumps was adequate for maximum pump flow requirements. The licensee initiated condition report 136802 for this particular concern.
- In response to an unresolved item in Inspection Report 50-254,265/01-08, the licensee performed calculations that correlated venting time to entrapped air volume in order to demonstrate that the entrapped air vacated during monthly HPCI and RCIC surveillance vent tests was less than a predetermined volume. Calculations QDC-1400-M-1170, "Determination of Acceptance Criteria for RCIC and Core Spray System Monthly Vent Verification," and QDC-2300-M-0921, "Determination of Appropriate Acceptance Criteria for QCOS 2300-09, HPCI Monthly Vent Verification," determined the maximum venting time permitted during surveillance testing. When the calculation acceptance limits were translated into the surveillance procedures, QCOS 1300-10, "RCIC Vent Verification," and QCOS 2300-09, "HPCI Vent Verification," the procedure time uncertainty was not taken into consideration. Also, the surveillance procedures did not recognize that vent time was an acceptance limit which needed to be accurate to a "few" seconds; therefore, the procedures did not require the actual venting time to be measured. The inspectors did not identify any operability concerns since the minimum allowed venting time was relatively large (23 seconds) compared to the nominal procedure error (3 seconds). The licensee initiated condition report 136838 for this concern.

Analysis: This issue was due to a licensee performance deficiency in that design calculations did not include instrument or test uncertainty when developing procedure acceptance criteria. The mitigating systems cornerstone was affected because the examples identified were on the DGCW, HPCI and RCIC systems, which provide long term heat removal. No other cornerstones were degraded as a result of this issue. This finding was considered greater than minor because a loss of design control could affect the reliability of the DGCW, HPCI and RCIC systems to perform their safety functions. The inspectors evaluated the issue using Phase I of the significance determination

process. Because no operability concerns were identified, the issue was determined to be of very low safety significance (Green).

Enforcement: 10 CFR Part 50, Appendix B, Criterion III, "Design Control," requires, in part, that measures be established to assure that applicable regulatory requirements and the design basis are correctly translated into specifications, drawings, procedures, and instructions.

Contrary to the above, as of December 20, 2002, the design bases of the DGCW, HPCI and RCIC systems were not correctly translated into plant documents, in that design calculations did not adequately account for instrument and test uncertainty in establishing acceptance criteria to demonstrate that the DGCW, HPCI, and RCIC systems design basis capabilities were maintained. Because of the low safety significance of this issue and because it is in the licensee's corrective action program, the issue is being treated as a Non-Cited Violation, consistent with Section VI.A.1 of the NRC Enforcement Policy (NCV 50-254,265/03-02-02).

b.2 Corrective Action Effectiveness Observation

Inspection Report 50-254,265/02-07 discusses the repeat failure of the 2A residual heat removal room cooler normal/alternate switch in August 2002. Based on review of the maintenance history, the inspectors determined that the switch had failed on three earlier occasions between 1999 and 2002. In October 2001, the licensee evaluated the possible failure mechanisms for the switch and eliminated mechanical binding as a possible cause due to a lack of repeatability. The licensee's investigation of the August 2002 switch failure determined that the previous failures were likely caused by mechanical binding of the contactor mechanism. As a result, the licensee had inappropriately disregarded previous apparent causes which resulted in the corrective actions for the 1999 and 2001 switch failures not being effective. The licensee subsequently implemented a modification to remove the contactor mechanism from the room cooler circuitry while maintaining the Appendix R function.

.4 Assessment of Safety-Conscious Work Environment

a. Inspection Scope

The inspectors conducted interviews with plant staff to assess whether there were impediments to the establishment of a safety conscious work environment. During these interviews, the inspectors used Appendix 1 to Inspection Procedure 71152, "Suggested Questions for Use in Discussions with Licensee Individuals Concerning PI&R Issues," as a guide to gather information and develop insights. The inspectors also discussed the implementation of the Employee Concerns Program with the plant's Employee Concerns Program Coordinator.

b. Issues

In general, plant staff interviewed did not express any concerns regarding the safety conscious work environment. The staff was aware of, and generally familiar with, the corrective action program and other plant processes, including the employee concerns

program, to raise issues. Overall, licensee employees stated they felt free to raise concerns up to and including the very highest levels of the organizations. Some employees did indicate that, in raising concerns, there was a high probability that the issue would return to them for solutions; in general, the employees felt this was appropriate. One exception to the above is described below:

#### Observation on Safety Conscious Work Environment Within the Security Forces

The inspectors determined that most of the security related condition reports were written by security force management rather than security force officers. The inspectors questioned multiple security force officers regarding condition report initiation and learned that security management wrote most of the condition reports due to computer availability, efficiency, and to allow the individual security force members to continue required actions specified in the security plan without disruption. Most security force officers felt that security issues brought to management's attention were documented in condition reports when needed, that the condition reports accurately reflected the security force member's concern, and that evaluation and resolution of documented problems was acceptable.

While most security officers were comfortable having their supervisor document issues in the corrective action program, a majority of the officers were unaware of their ability to initiate condition reports independent of their supervision through the use of hand-written paper forms. In addition, some officers believed that items documented in condition reports always needed to go through the security chain of command. Licensee personnel initiated condition report 136729 to document these issues during the inspection. The inspectors asked several follow up questions to determine if the individuals interviewed were aware of any items that had not been entered into the corrective action program due to disagreement between the individual officer and security management or because of management discretion. None of the officers interviewed were aware of any previously identified issues that were not in the corrective action program.

#### 40A3 Event Follow-up

##### .1 Review of Previously Identified Items

###### a. Inspection Scope

The inspectors reviewed previously identified unresolved items and cited violations to determine if sufficient information existed to close the issue.

###### b. Observations

(Open) Unresolved Item 50-254,265/96-11-06, "Pipe Whip Restraints Found Installed Incorrectly." The inspectors reviewed drawings and calculations, and conducted a walkdown of three of the five pipe whip restraints involved. Following the inspection, the inspectors discussed the issue with the Office of Nuclear Reactor Regulation (NRR). This item remains open, pending NRR action.

(Open) Unresolved Item 50-254/01-08-02, "Calculations on Air in HPCI & RCIC Lines Do Not Appear to Support Assertions in Root Cause Analysis." The inspectors reviewed the associated procedures and calculations for this issue, as discussed in Section 4OA2.3.b1. However, the inspectors were unable to completely correlate the acceptable volume of air provided in the calculations with the time the systems were vented in the December 2000 event of interest. Therefore, this item remains open pending further NRC review.

(Closed) Violation 50-265/01-12-01, "Failure to Accurately Report Performance Indicator." The inspectors reviewed the root cause report, the associated corrective actions to prevent recurrence and other associated documents. The inspectors also interviewed licensee employees about both the underlying technical issue and the violation. The inspectors determined that the corrective actions appeared appropriate to prevent recurrence. This item is closed.

#### 4OA6 Meetings

##### .1 Exit Meeting

The inspectors presented the inspection results to Mr. Tulon and other members of licensee management at the conclusion of the inspection on December 20, 2002. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

## KEY POINTS OF CONTACT

### Licensee

D. Barker, Radiation Protection Manager  
W. Beck, Regulatory Assurance Manager  
G. Boerschig, Work Control Manager  
R. Detwiler, Operations Support Manager  
M. DeVault, Training Manager  
R. Gideon, Engineering Manager  
K. Leech, Security Manager  
K. Moser, Chemistry Manager  
P. O'Neil, Corrective Action Program Manager  
M. Perito, Operations Manager  
M. Snow, Nuclear Oversight Manager  
M. Sullivan, Maintenance Services Manager  
B. Swenson, Plant Manager

### Illinois Department of Nuclear Safety

R. Ganser, Resident Inspector  
C. Settles, Division Chief

## LIST OF DOCUMENTS REVIEWED

### **Calculations**

QDC-1000-M-0131; Net Positive Suction Head Availability Versus Requirements for Diesel Generator Cooling Water and Residual Heat Removal Service Water Pumps; Revision 2A

QDC-1400-M-1170; Determination of Acceptance Criteria for Reactor Core Isolation Cooling and Core Spray System Monthly Vent Verifications; Revision 1

QDC-2300-M-0921; Determination of Appropriate Acceptance Criteria for QCOS 2300-09, High Pressure Coolant Injection Monthly Vent Verification; Revision 3

### **Condition Reports Reviewed during the Inspection (Includes Apparent Cause Evaluations)**

01-00937; Unit 2 Feedwater Heater Trip; dated March 23, 2001

01-01703; Action Tracking Sub Assignments Overdue; dated June 1, 2001

01-01708; Exelon Employee Forgot Security Badge; dated June 2, 2001

01-01713; Operations Did Not Ensure Timely Supervisor Review of Q2001-01704; dated June 4, 2001

01-01729; Unacceptable Measuring and Test Equipment Evaluation; dated June 2, 2001

01-01760; Measuring and Test Equipment Not Returned to the Quality Assurance Tool Room; dated June 4, 2001

01-01773; Security Badge Left at Home by an Exelon Employee; dated June 7, 2001

01-01791; Security Badge Left Home by Exelon Employee; June 8, 2001

01-01806; Untimely Condition Report Supervisor Review; dated June 11, 2001

01-01946; Measuring and Test Equipment # I008931 Torque Wrench Lost; dated June 11, 2001

01-01968; Missing Calibration Record for Measuring and Test Equipment Out of Tolerance Evaluation #00-0105; dated June 12, 2001

01-01975; Action Tracking Item Overdue in System Engineering; dated June 19, 2001

01-01991; Measuring and Test Equipment Returned to Mechanical Maintenance Quality Assurance Tool Room over Weekend; dated June 24, 2001

01-02018; Security Badge Left Home by Exelon Employee; dated June 27, 2001

01-02029; Discrepancies for Feedwater Heater Level and Trip Instrumentation; dated June 27, 2001

01-02032; Measuring and Test Equipment Evaluation Due Dates Extended; dated June 30, 2001

01-02062; Temporary Fans Installed on Unit 2 Hydrogen Seal Oil Vacuum Pump Without Temporary Modification; dated May 3, 2001

01-02063; Measuring and Test Equipment Evaluation 00-0131 Found Unacceptable During Technical Evaluation; dated July 3, 2001

01-02074; Condition Report Q2001-01749 Placed 'On Hold' and Not Rescreened; dated July 2, 2001

01-02100; Instrument Calibrated Using Incorrect Calibration Data; dated July 6, 2001

01-02106; Work Control Overdue Action Tracking Assignments; dated July 1, 2001

01-02114; 2A Moisture Separator Drain Tank Level Oscillations; dated July 6, 2001

01-02142; Dose Rates in 2A Residual Heat Removal Room Subgrating Approaching Locked High Radiation Area Status; dated July 12, 2001

01-02187; Improperly Controlled Security Badge; dated July 12, 2001

01-02227; Missed Action Tracking Due Date; dated July 16, 2001

01-02254; Condition Report Supervisory Review Not Performed Within Required Time Frame; dated July 18, 2001

01-02269; Nuclear Oversight Identified: Condition Reports Not Generated for Identified Problems; dated July 19, 2001

01-02285; Rejected/Lost Measuring and Test Equipment; dated July 22, 2001

01-02306; Security Badge Left Home by Exelon Employee; dated July 22, 2001

01-02335; Failure to Complete Action Tracking Assignment Before Due Date; dated July 20, 2001

01-02379; Broken/Lost Measuring and Test Equipment; dated July 25, 2001

01-02394; Security Badge Left at Home; dated July 29, 2001

01-02398; Hydraulic Control Unit Pressure Switches Were Calibrated With Unapproved Pressure Gauge; dated July 27, 2001

01-02474; Security Badge Left at Home; dated August 6, 2001

01-02518; Errors in PowerLabs Test Report Concerning Emergency Diesel Generator Fuel Oil Solenoid Failure; dated August 9, 2001

01-02555; Failure to Identify Additional Hazardous Substance on Shipping Papers; dated August 13, 2001

01-02582; Multiple NRC Performance Indicator Reporting/ Interpretation Issues; dated August 16, 2001

01-02642; Security Badge Left Home by Exelon Employee; dated August 22, 2001

01-02717; Security Badge Left Home by Exelon Employee; dated August 29, 2001

01-02739; Temporary Modification Requirements not Incorporated into Procedures; dated August 30, 2001

01-02828; Security Badge Left Home by Exelon Employee; dated September 10, 2001

01-02840; Security Badge Left in Other Vehicle; dated September 12, 2001

01-02866; Failure to Write a Condition Report for Clearance Order Document Discrepancy; dated September 13, 2001

01-02893; Lost Security Badge Outside of Protected Area; dated June 17, 2001

01-02901; Extended Power Uprate Analysis Discovers Potential to Lift Standby Liquid Control Pump Discharge Relief Valves During Anticipated Transient Without Scram Transient; dated September 18, 2001

01-02928; Condition Report but No Corrective Actions for Work on Flow Instrument Switch for Drywell Air Sample Oxygen Analyzer; dated September 19, 2001

01-02984; Late Supervisory Review on Condition Report 01-02948; dated September 24, 2001

01-03010; Measuring and Test Equipment Out of Tolerance Not Received From PowerLabs; dated September 25, 2001

01-03034; Uncontrolled Security Badge in the Protected Area; dated September 29, 2001

01-03050; Tornado Potential Missiles (Further Actions Necessary); dated October 2, 2001

01-03091; Senior Reactor Operator Rotation Requirements of TQ-AA-106 Not Met During Annual Dynamic Exam; dated October 8, 2001

01-03097; Unexpected Alarm 902-6 A-11; dated October 5, 2001

01-03155; Safety System Design Inspection: Diesel Generator Cooling Water U-Bolt Support Missing; dated October 10, 2001

01-03157; Nuclear Oversight Identifies Potential Uncontrolled Temporary Modifications; dated October 9, 2001

01-03167; Condition Report 01-03136 Was Not Supervisory Reviewed in a Timely Manner; dated October 12, 2001

01-03168; Fluke Used for Local Standby Liquid Control Thermocouple Readings Three Weeks out of Calibration; dated October 12, 2001

80600; Corporate Assignment To Present Apparent Cause Evaluation to Management Review Committee Overdue; October 26, 2001

80970; Nuclear Oversight Identified: Untimely Corrective Actions; dated October 29, 2001

80987; Missing Baseplate for Stanchion Support on Line 0-4301B-6"-L; dated October 30, 2001

82280; Exelon Maintenance Worker Lost Badge in Protected Area; dated November 8, 2001

82908; Condition Report Supervisory Reviews not Completed in a Timely Manner; dated November 14, 2001

83371; Inadequate Mechanical Maintenance Condition Report Supervisory Review – Excessive Time to Correct; dated November 19, 2001



85033; Nuclear Oversight Identified: Degraded Supports in 1B/1C/1D Residual Heat Removal Service Water Rooms; dated December 4, 2001

85928; Nuclear Oversight Identified: Untimely Corrective Actions; dated December 10, 2001

88708; 2C2 Heater Emergency Drain Valve Open Alarm; dated January 1, 2002

88844; Two Condition Reports in Hold for Approval for Two Weeks Because of Route List Problem; dated January 2, 2002

88928; Reactor Core Isolation Cooling System Inoperable Due to Failed QCOS 1300-10 Surveillance Test; dated January 4, 2002

89920; Piping Support Discrepancies in Residual Heat Removal Service Water Vaults; dated December 19, 2001

91766; Residual Heat Removal Service Water Motor Load Value Is Different in QCOA 6100-03 and QCOA 6100-04; dated January 22, 2002

91880; Reduced Seismic Criteria Used to Qualify Residual Heat Removal Service Water Piping; dated January 17, 2002

92743; Uncontrolled Security Badge Inside the Protected Area; dated January 28, 2002

92943; Normally Closed Valve Found Throttled Open and Damaged; dated January 28, 2002

92983; Updated Final Safety Analysis Report 8.3.1.8 Motor Starting Voltage Incorrectly Stated; dated January 29, 2002

93115; Calculation Qualification to Turndown Residual Heat Removal Service Water Pump Anchor Bolts; dated January 16, 2002

93221; Residual Heat Removal Support With Missing Pipe Clamp Bolt; dated March 22, 2002

93281; Motor Control Center Voltages in Degraded Voltage Calculations; dated January 31, 2002

93308; Discrepancies Between Electrical Load Monitoring System and Voltage Calculations; dated January 31, 2002

93336; Operability Evaluation for 1A Residual Heat Removal Heat Exchanger Leak Needs Enhancement; dated January 31, 2002

93368; Inservice Testing Data Suggests Higher Suction Losses for Diesel Generator Cooling Water and Residual Heat Removal Service Water Pumps; dated January 31, 2002

93394; QCOP 5750-09 Load Shed Guidance Concern; dated January 31, 2002

93433; Corporate Corrective Action Extended Twice by Station Without Progress (80984); dated August 17, 2002

93444; Residual Heat Removal Service Water Vault Room Cooler Leak Operability Evaluation Had Inadequate Follow up; dated January 31, 2002

93644; Measuring and Test Equipment Out of Tolerance Report Not Received From PowerLabs; dated February 3, 2002

93679; Freeze Seal Exhaust Inadvertently Freezes Adjacent Pipe; dated February 4, 2002

94053; Badge, Thermoluminescent Dosimeter, and Lanyard Lost Offsite; dated February 6, 2002

94354; Condition Report Supervisory Review Not Performed Within Required Time Frame; dated February 14, 2002

94362; Nuclear Oversight Identified: Condition Report Not Written for Leaking Scram Valves; dated February 06, 2002

94438; Failure to Enter Corrective Actions to Prevent Recurrence, Corrective Actions, and NRC Commitments into Action Tracking System; dated February 7, 2002

94584; 1B Feedwater Heater Trip due to High Level in 1A Flash Tank; dated February 9, 2002

94841; Unit 2 Steam Line Insulation Found Loose; dated February 19, 2002

94917; Reactor Vessel Insulation Package Buildup of Pressure Resulting in Steam Release; dated February 14, 2002

95131; Improper Badge Control and Failure to Use Card Reader; dated February 14, 2002

95150; Improper Badge Control Instrument Maintenance Worker; dated February 13, 2002

95280; 2A Standby Liquid Control Pump Tripped While Performing QCTS 0340-01; dated February 19, 2002

95850; Contractor Lost Security Badge Inside the Unit 2 Drywell; dated February 19, 2002

95968; Uncontrolled Security Badge Inside Unit 2 High Pressure Coolant Injection Room; dated February 20, 2002

95988; Uncontrolled Visitor in the Service Building General Electric Office; dated February 28, 2002

96071; Uncontrolled Security Badge in Protected Area; dated February 21, 2002

96104; Uncontrolled Security Badge in Protected Area; dated February 21, 2002

96155; Unit 1 D Heaters Tripped At Full Power; dated February 21, 2002

96505; Improper Badge Control and Improper Card Reader Use; dated February 23, 2002

97218; Post Event Fitness For Duty Test; dated February 23, 2002

97660; Nuclear Oversight Identified: Lead Hung from Beam Without Proper Documentation; dated February 16, 2002

97694; Unit 2 Reactor Head Vent Bypass Valves Found Open; dated March 4, 2002

98412; Unit 2 Extended Power Uprate Vibration Monitoring Difficulties; dated March 7, 2002

99790; Action Tracking Items Not Completed by the Due Date; dated March 18, 2002

100133; Lost Security Badge; dated March 18, 2002

100163; For Cause Fitness For Duty Test; dated March 20, 2002

100202; Temporary Modification Found Altered ; dated March 20, 2002

100473; Incorrect Availability Call for Unit 1 High Pressure Coolant Injection Turning Gear Logic Test; dated April 29, 2002

101320; High Pressure Coolant Injection Uncoupled with Reactor Pressure Greater Than 150 Pounds; dated March 27, 2002

102091; Main Steam Leak Causes Load Reduction and Turbine Removal; dated April 2, 2002

102133; Siren Performance Indicator Data Provided by Contractor Was Incorrect; dated April 3, 2002

102363; For Cause Fitness For Duty Test; dated April 4, 2002

102456; Unit 2 Feedwater Heater Unable to be Latched; dated April 4, 2002

104264; Three Injuries in Mechanical Maintenance Found with No Condition Reports Written to Document; dated April 17, 2002

104321; Unauthorized Retaining Clamps Used for Hydraulic Control Unit Accumulators; dated April 18, 2002

105454; General Electric Part 21 SC 02-05: Failure of CR105X Auxiliary Contacts; dated April 26, 2002

107479; Discrepancies in PowerLabs Out of Tolerance Listing Reports; dated May 9, 2002

107669; Initial Inspection for NON DR-01-060 did not Identify Missing Plunger Washers; dated May 7, 2002

107939; Untimely Supervisory Review of Condition Reports by Mechanical Maintenance; May 13, 2002

109717; A Security Officer Lost His Badge and Thermoluminescent dosimeter at Home; dated May 28, 2002

111865; Nuclear Oversight Identified: Potential Unauthorized Temporary Modification; dated June 12, 2002

113395; Greater than Expected Drop Through Residual Heat Removal Service Water and Diesel Generator Cooling Water Pump Suction Piping; dated June 26, 2002

113673; Action Items Not Entered and Completion Reviews Not Timely; dated June 28, 2002

113899; Undocumented Configuration Change to Unit 2 Low Flow Feedwater Regulating Valve; dated June 30, 2002

115462; Oil Reservoir on 2B Residual Heat Removal Service Water Pump Was Found Empty after a Pump Run; dated July 12, 2002

115472; Employee Lost His Badge; dated July 13, 2002

115514; Employee Reported to Work Without Security Badge; dated July 13, 2002

115728; Security Badge Lost; dated June 28, 2002

116171; Contractor Improperly Controlled Photo Badge; dated July 17, 2002

116239; A Security Supervisor Lost Security Badge Off Site; dated July 18, 2002

116383; Reactor Head Tensioning Commenced Without Temperature Indication; dated July 20, 2002

116566; Nuclear Oversight Identified: Grout Placed Around Untorqued Concrete Expansion Anchors; dated July 22, 2002

120651; 2B Residual Heat Removal Service Water High Pressure Pump Bearing Spilled Oil; dated August 26, 2002

123322; Water in Radioactive Shipment; dated September 12, 2002

123900; Instrument Maintenance Overdue Action Tracking Assignment; dated September 20, 2002

124777; Nuclear Oversight Identified: Concrete Spalling for Expansion Hangers; dated September 25, 2002

125087; Condition Report Supervisory Review Not Performed after Seven Days; dated September 30, 2002

125090; Condition Report Supervisory Review Not Performed after Seven Days; dated September 30, 2002

125092; Condition Report Supervisory Review Not Performed after Five Days; dated September 30, 2002

125430; Overdue Action Tracking Item Concerning Change to LS-AA-1003; dated October 1, 2002

125563; Employee Reported to Work Without Security Badge; dated October 2, 2002

126052; 2A Reactor Feed Pump Suction Relief Valve Leak at Welded Connection; dated October 6, 2002

126582; Operations Shift Review Not Done in a Timely Manner for Condition Report 125706; dated October 9, 2002

127282; Unauthorized Temporary Configuration Change on Service Water in Cribhouse; dated October 21, 2002

127393; For Cause Fitness For Duty Test; dated October 14, 2002

127396; For Cause Fitness For Duty Test; dated October 15, 2002

127620; Condition Report Not Initiated for Unit 2 Service Water Radiation Monitor Being Inoperable; dated October 16, 2002

127649; Condition Reports Receiving Untimely Supervisory Review; dated October 15, 2002

128809; Improper Badge Control by Contractor; dated October 24, 2002

128835; Condition Report Review Process Lends Itself to Delays; dated October 24, 2002

129055; For Cause Fitness For Duty Test; dated October 24, 2002

129056; For Cause Fitness For Duty Test; dated October 30, 2002

129409; For Cause Fitness For Duty Test; dated October 31, 2002

129665; 2B3 Heater Trip; dated October 31, 2002

131690; NRC Identified: Potential Common Cause Scaffolding Issues; dated November 14, 2002

131697; NRC Identified: Drywell Foreign Material Exclusion Controls Might Not Be Adequate; dated November 14, 2002

133010; Broken Pipe Support on Line 1-3405-16" near Motor Operated 1-3402C Valve; dated November 24, 2002

133233; Nuclear Oversight Identified: Corrective Action Not Established For 1A Residual Heat Removal Heat Exchanger Leak; dated November 26, 2002

133433; High Pressure Coolant Injection Turbine Casing Leaks Noted on Startup Testing; dated December 2, 2002

133593; Lack of Documented Evaluation of Dry Chemical Release in Unit 1 Drywell; dated December 4, 2002

134191; Leak on Unit 1 Reactor Feed Pump Drain Line Valve; dated December 10, 2002

135466; Vibration of Steam Lines May Increase Risk of Test Tap Line to Break; dated December 12, 2002

### **Condition Reports Written as a Result of the Inspection**

134211; Reduced Seismic Criteria; dated December 5, 2002

135692; Condition Reports Not Written for NRC Identified Items; dated December 19, 2002

136195; Improper Use of Bounding for 1A Residual Heat Removal Heat Exchanger Operability Evaluation Issue; dated December 19, 2002

136602; Maintenance Rule Database Does Not Allow Parallel Functional Failure Review; dated December 19, 2002

136646; Apparent Excessive Replacement Rate for Reactor Feedpump Valves 1 & 2 3299-56 A, B, & c; dated December 19, 2002

136696; Possible Cavitation of Condensate Pumps; dated December 19, 2002

136714; Security Defensive Strategy, Barrier Improvement Question; dated December 19, 2002

136729; Identified Problem Reporting ; dated December 19, 2002

136802; Minimum Net Positive Suction Head Calculation Did Not Consider Instrument Inaccuracy; dated December 19, 2002

136838; Improper Translation of Design Requirements into Operation Procedures; dated December 19, 2002

### **Effectiveness Reviews**

30205; Effectiveness Review for Condition Report 00-2153; dated July 2, 2001

33829; Effectiveness Review for Condition Report 00-2994; dated July 15, 2001

44542; Effectiveness Review for Condition Report 01-0381; dated March 15, 2002

44546; Effectiveness Review for Condition Report 01-0385; dated March 15, 2002

44548; Effectiveness Review for Condition Report 01-0387; dated June 15, 2001

51771; Effectiveness Review for Condition Report 01-1384; dated January 20, 2002

72863; Effectiveness Review for NRC Generic Letters; dated December 22, 2001

116383-07; Revise Procedure QCIP 0200-08 to Include Appropriate Testing to Prevent Recurrence; dated December 10, 2002

**Internal Operating Experience Reviews** ( Includes Nuclear Operations Notifications and Nuclear Event Reports)

BW-02-043; Fisher Model 67CFR Regulators Installed on Air Operated Valves May Not Allow the Valve to Move to the Fail Safe Position on Loss of Instrument Air; dated August 5, 2002

DR-01-041; Technical Recommendations of Oil Reservoir Levels for General Electric Vertically Mounted Induction Motors When in Standby; dated June 15, 2001

DR-01-055; Corrective Action Program; dated August 29, 2001

DR-01-060; Recirculation Motor Operated Valve Failed to Close Due to Binding Aux Contact; dated September 7, 2001

DR-01-079; Fatal Flaw Discovered in Recirculation Motor Generator Sets Voltage Regulator Tuning Procedure; dated October 4, 2001

DR-01-086; Configuration Control Issue with Motor Operated Valve Design Basis Documentation/Impact of Extended Power Uprate on Motor Operated Valve Equipment Qualification Temperatures and Differential Pressure Calculations; dated October 31, 2001

DR-02-012; Inconsistent Application of Valve Weak Link Multipliers; dated February 6, 2002

DR-02-023; 2B Moisture Separator Drain Tank Normal Level Transmitter Failed High in Output Resulting in Downstream Feedwater Heaters Receiving Increased Drain Flow; dated February 27, 2002

DR-02-042; Valve Disk Separation Resulted in Loss of Cooling Flow and Control Room Emergency Ventilation System Inoperability; dated August 5, 2002

DR-02-050; Guide Pins Discovered in Primary Containment Penetrations Between Concrete Wall Penetration Sleeves and Process Piping; dated August 15, 2002

DR-02-056; Failure of Main Turbine Front Standard Components that Resulted in Turbine Trip and Reactor Scram; dated August 22, 2002

LI-01-010; Unit 2 Reactor Scram – Generator Alterrex Current Transformer Wiring; dated August 10, 2001

LI-02-027; Limerick Unit 2 Manual Reactor Scram Due to Degrading Condenser Vacuum; dated August 15, 2002

LS-01-041; Reactor Core Isolation Cooling Cold Quick Start Definition Discrepancy; dated August 3, 2001

LS-01-062; Unit 2 Condensate Storage Tank Overfill and Rupture; October 15, 2001

OC-02-017; Fuel Pool Siphoning Event; dated May 14, 2002

PB-01-012, Supplement 1; Turbine Trip due to Electrohydraulic Control Power Supply Failure; dated August 29, 2001

### **Miscellaneous**

List by Department of Average Time Condition Reports Take from Initiation to Management Review Committee Approval from November 2001 Through November 2002; dated December 10, 2002

Instrument Calibration Data Sheet for Pressure Switch PS1-0305-130; dated December 27, 1996

33563; Action Request: High Pressure Coolant Injection Turbine Casing Joint Leakage Still Exists; dated December 12, 2000

### **Operability Evaluations**

79047; Residual Heat Removal Heat Exchanger 1A Primary to Secondary Tube Leak; dated February 6, 2002

105454; General Electric Part 21 SC 02-05: Failure of CR105X Auxiliary Contacts; dated May 12, 2002

113395; Greater than Expected Pressure Drop Through Residual Heat Removal Service Water and Diesel Generator Cooling Water Pump Suction Piping; Revision 0

### **Procedures**

LS-AA-105; Operability Determinations; Revision 0

LS-AA-115; Operating Experience Program; Revision 0

LS-AA-125; Corrective Action Program Procedure; Revision 4

LS-AA-125-1001; Root Cause Analysis Manual; Revision 3



LS-AA-2010; Monthly Performance Indicator Data Elements for Unplanned Scrams per 7000 Critical Hours; Revision 3

MA-AA-716-040; Control of Measuring and Test Equipment; Revision 0

QIP 0100-17; Balance of Plant Calibration Schedule Non-outage Related; Revision 13

QCOS 2300-09; High Pressure Coolant Injection Vent Verification; Revision 15

QCOS 1300-10; Reactor Core Isolation Cooling Vent Verification; Revision 15

SY-AA-101-118; Control of Badges; Revision 1

SY-AA-101-130; Security Responsibilities for Station Personnel; Revision 3

SY-AA-103-514; Fabrication of Security Badges; Revision 7

### **Root Cause Reports**

51312-15; Failure of the Unit 2 Emergency Diesel Generator Fuel Oil Transfer System Solenoid Due to Thermal Pressurization of the Fuel Oil Line Due to an Inadequate Original Design; dated September 6, 2001

84608-02; 10 CFR 50.9 Violation Received for Failure to Provide Complete and Accurate Data Concerning Fault Exposure Hours Associated with the Failure of Emergency Diesel Generator Fuel Oil Transfer Solenoid Valve; dated December 26, 2001

116383-02; Reactor Head Tensioning Begun Without Temperature Indication Due to Improper Makeup of Temporary Thermocouples; dated August 29, 2002

### **Site Integrated Assessments**

2002 QII; Site Integrated Performance Assessment Report; dated August 27, 2002

2002 QIII; Site Integrated Performance Assessment Report; dated December 5, 2002

### **Work Orders**

99263822; Valve Has Eleven Drops per Minute Packing Leak – Mechanical Maintenance Assist Furmanite with Installation; dated July 5, 2001

00498422; Calibrate Pressure Switches and Gauge; Functionally Test Hydraulic Control Unit Level Switches; dated December 11, 2002

## LIST OF ACRONYMS USED

ADAMS	Agency-wide Documents Access and Management System
BWRVIP	Boiling Water Reactor Vessel Internals Project
CAPCO	Corrective Action Program Coordinator
CFR	Code of Federal Regulations
DGCW	Diesel Generator Cooling Water
FIN	Finding
HPCI	High Pressure Coolant Injection
NCV	Non-Cited Violation
NPSH	Net Positive Suction Head
NRC	Nuclear Regulatory Commission
PARS	Publicly Available Records
RCIC	Reactor Core Isolation Cooling