October 30, 2003

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

SUBJECT: BYRON STATION, UNITS 1 AND 2
NRC INTEGRATED INSPECTION REPORT 05000454/2003006;
05000455/2003006

Dear Mr. Skolds:

On September 30, 2003, the U.S. Nuclear Regulatory Commission (NRC) completed an integrated inspection at your Byron Station, Units 1 and 2. The enclosed report documents the inspection findings which were discussed on October 14, 2003, with Mr. S. Kuczynski and other members of your staff.

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

Based on the results of this inspection, three findings of very low safety significance (Green) were identified in the report. All of the findings were determined to involve violations of NRC requirements. However, because of the very low significance of these three findings, and because they were entered into your corrective action program, the NRC is treating the issues as Non-Cited Violations in accordance with Section VI.A.1 of the NRC's Enforcement Policy.

If you contest the subject or severity of a Non-Cited Violation, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy to the Regional Administrator, U.S. Nuclear Regulatory Commission - Region III, 801 Warrenville Road, Lisle, IL 60532-4351; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the Resident Inspector office at the Byron facility.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be made 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/***

Ann Marie Stone, Chief
Branch 3
Division of Reactor Projects

Docket Nos. 50-454; 50-455
License Nos. NPF-37; NPF-66

Enclosure: Inspection Report 05000454/2003006; 05000455/2003006
w/Attachment: Supplemental Information

cc w/encl: Site Vice President - Byron
Byron Station Plant Manager
Regulatory Assurance Manager - Byron
Chief Operating Officer
Senior Vice President - Nuclear Services
Vice President - Mid-West Operations Support
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REGION III

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| Docket Nos: | 50-454; 50-455 |
| License Nos: | NPF-37; NPF-66 |
| Report Nos: | 05000454/2003006; 05000455/2003006 |
| Licensee: | Exelon Generation Company, LLC |
| Facility: | Byron Station, Units 1 and 2 |
| Location: | 4450 N. German Church Road<br>Byron, IL 61010 |
| Dates: | July 1, 2003 through September 30, 2003 |
| Inspectors: | R. Skokowski, Senior Resident Inspector<br>P. Snyder, Resident Inspector<br>R. Alexander, Radiation Specialist<br>A. Dunlop, Senior Reactor Inspector<br>H. Peterson, Senior Operations Engineer<br>C. Thompson, Illinois Department of Nuclear Safety<br>K. Walton, Operations Examiner |
| Approved by: | Ann Marie Stone, Chief<br>Branch 3<br>Division of Reactor Projects |

Enclosure

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## SUMMARY OF FINDINGS

IR 05000454/2003006, 05000455/2003006; on 07/01/2003-09/30/2003; Byron Station; Units 1 & 2; Maintenance Effectiveness, Access Control to Radiologically Significant Areas.

This report covers a 3-month period of baseline resident inspection and announced baseline inspection on radiation protection. The inspections were conducted by Region III inspectors and the resident inspectors. Three Green findings, all of which were violations of NRC requirements, were identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be "Green" or be assigned a severity level after NRC management review. 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 and Self-Revealed Findings

**Cornerstone: Mitigating Systems**

- Green. A finding of very low safety significance and an associated Non-Cited Violation (NCV) were identified through a self-revealing event. The licensee failed to adequately specify, in procurement documentation, the proper length for a replacement resistance temperature detector (RTD) installed into the diesel engine oil pan of the train B essential service water makeup pump assembly. This was discovered when an engineer observed excessive vibration of the RTD during the diesel pump operation. The vibration was excessive enough such that continued operability of the pump to perform its intended safety function could not be assured without removing the RTD. The primary cause of this finding was related to the cross-cutting area of Human Performance. The licensee removed the RTD to correct the problem; however, this resulted in additional system unavailability time.

  This finding was more than minor because it involved the equipment availability attribute of the Mitigating System cornerstone objective regarding the availability of a system that responds to initiating events to prevent undesirable consequences. The finding was of very low safety significance because there was no design deficiency, no actual loss of safety function, no single train loss of safety function for greater than the technical specification allowed outage time and no risk due to external events. The issue was a Non-Cited Violation of 10 CFR 50, Appendix B, Criterion IV, "Procurement Document Control." (Section 1R12)

- Green. A finding of very low safety significance and an associated NCV were identified through a self-revealing event. The licensee failed to follow procedure for nickel cadmium battery bank surveillances when the licensee added boric acid as a makeup electrolyte solution vice demineralized water, as specified in the procedure, into the nickel cadmium battery bank cells that supply power to start the diesel engine of the train B essential service water makeup pump assembly. This primary cause of this finding affects cross-cutting area of Human Performance. The licensee replaced the

battery assemblies to correct the problem; however, this resulted in additional system unavailability time.

This finding was more than minor because it involved the equipment availability attribute of the Mitigating System cornerstone objective regarding the availability of a system that responds to initiating events to prevent undesirable consequences. The finding was of very low safety significance because there was no design deficiency, no actual loss of safety function, no single train loss of safety function for greater than the technical specification allowed outage time and no risk due to external events. The issue was a Non-Cited Violation of Technical Specification paragraph 5.4.1(a) which required adherence to written procedures for performing maintenance that can affect the performance of safety-related equipment. (Section 1R12)

**Cornerstone: Occupational Radiation Safety**

- Green. A finding of very low safety significance and an associated NCV were identified through a self-revealing event, when a station laborer failed to comply with a radiological posting controlling access into the Radiologically Controlled Area (RCA) of the station while delivering a food order intended for the Technical Support Center. The primary cause of this finding was related to the cross-cutting area of Human Performance. The laborer's failure to read and comply with the radiological posting resulted in his unauthorized entry into the RCA without the appropriate additional radiological controls (Radiation Worker Training, Radiation Work Permit, and primary and secondary dosimetry).

  The issue was more than minor because it was associated with the "Human Performance" attribute of the Occupational Radiation Safety cornerstone and affected the cornerstone objective in ensuring adequate protection of worker health and safety from exposure to radiation from radioactive material. The cornerstone objective was affected because the RCA boundary posting violated by the laborer represents the final radiation exposure barrier in the field for those workers who are not normally authorized to enter the RCA. Although the laborer entered the RCA without the appropriate radiological controls, the radiological conditions the laborer could have encountered were not sufficient to produce a substantial potential for an exposure in excess of regulatory limits. Therefore, the finding was of very low safety significance. One Non-Cited Violation for the failure to meet the requirements of the licensee's procedure controlling access to the RCA was identified. (Section 2OS1.2)

## B. Licensee Identified Violations

No violations of significance were identified.

## REPORT DETAILS

### Summary of Plant Status

Unit 1 operated at or near full power throughout the inspection period except on July 6, 2003, when power was reduced about 70 percent for load following and turbine throttle valve/governor valve testing. The reactor was shutdown for a routine refueling outage on September 22, 2003, and remained shutdown for the remainder of the period.

Unit 2 operated at or near full power throughout the inspection period, except on July 13, 2003, when power was reduced to about 81 percent for load following. During the down power, power was reduced by approximately an additional 3.5 percent due to a turbine digital electro-hydraulic control issue.

On August 28, 2003, after evaluation and comparison between newly installed precision flow measurement instrumentation on the common feedwater header in Unit 1, the licensee identified an error in previously installed ultrasonic feedwater flow measurement instrumentation used in the calorimetric calculation for reactor power. Because of the discrepancy on Unit 1, an investigation was conducted on Unit 2 revealing a similar issue. As a result, power on Unit 1 was reduced about 1.5 percent and power on Unit 2 was reduced about 0.5 percent. Later that day, calorimetric calculations were reperformed to establish a new full power level for both units. After August 28, both units operated at the newly established full power levels. Issues associated with the feedwater flow instruments and the potential impact on thermal power were previously identified and were being tracked as Unresolved Item 50-454/03-02-03.

### 1. REACTOR SAFETY

#### Cornerstone: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01)

a. Inspection Scope

The inspectors completed one inspection sample with their review of the licensee's response to severe thunderstorm warnings on July 7, 2003. The inspectors evaluated licensee performance by comparing actual performance to the licensee management expectations and guidelines as presented in Byron Abnormal Operating Procedure 0BOA ENV-1 entitled "Adverse Weather Conditions."

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment (71111.04)

a. Inspection Scope

The inspectors performed two partial walkdowns of accessible portions of trains of risk-significant mitigating systems equipment during times when the trains were of increased importance due to the redundant trains or other related equipment being unavailable. The inspectors utilized the valve and electric breaker checklists listed in the Attachment at the end of this report and applicable system drawings to verify that the components were properly positioned and that support systems were lined up as needed. The inspectors also examined the material condition of the components and observed operating parameters of equipment to verify that there were no obvious deficiencies. The inspectors used the information in the appropriate sections of the Updated Final Safety Analysis Report (UFSAR) to determine the functional requirements of the systems.

The inspectors verified the alignment of the following trains:

- Unit 2 containment spray train A while train B was out of service for eductor flow verification on July 15, 2003; and
- Units 1 and 2 component cooling water heat exchanger alignments while the Unit 0 heat exchanger was out of service on August 11, 2003.

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05)

a. Inspection Scope

The inspectors conducted fire protection walkdowns that were focused on availability, accessibility, and the condition of fire fighting equipment; the control of transient combustibles and ignition sources; and on the condition and operating status of installed fire barriers. The inspectors reviewed applicable portions of the Byron Station Fire Protection Report and selected fire areas for inspection based on their overall contribution to internal fire risk, as documented in the Individual Plant Examination of External Events Report. The inspectors verified that fire hoses and extinguishers were in their designated locations and available for immediate use; that fire detectors and sprinklers were unobstructed; that transient material loading was within the analyzed limits; and that fire doors, dampers, and penetration seals appeared to be in satisfactory condition. The documents listed in the Attachment at the end of this report were also used by the inspectors to evaluate this area.

The inspectors completed six inspection samples by examining the plant areas and activities listed below to observe conditions related to fire protection:

- Laundry room (Zone 11.6C-1) on July 7, 2003;
- Unit 2 Auxiliary Feedwater Tunnel (Zone 18.3-2) on July 16, 2003;

- Unit 1 train B auxiliary feedwater pump room (Zone 11.4A-1) during hot-work on July 10, 2003;
- Unit 1 lower cable spreading room (Zone 3.2A-1) on August 22, 2003;
- Unit 2 lower cable spreading room (Zone 3.2A-2) on August 26, 2003; and
- Unit 1 containment hot work observed on September 26, 2003.

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures (71111.06)

a. Inspection Scope

During the week of August 25, 2003, the inspectors evaluated the licensee's controls for mitigating external and internal flooding by completing a semi-annual sample. Specifically, the inspectors performed the following: 1) reviewed the licensee's plan for inspection of underground cable vaults; 2) observed the licensee's actions taken to drain flooded underground cable vaults for cables to the essential service water cooling towers on August 22 and 25, 2003; and 3) reviewed selected records documenting the evaluation of underground cables for submergence.

In addition, the inspectors utilized the following references during the completion of their review:

- NRC Information Notice 2002-12; Submerged Safety-Related Electrical Cables; March 21, 2002; and
- NRC Regulatory Issue Summary 2003-009; Environmental Qualification of Low-Voltage Instrumentation and Control Cables; May 2, 2003.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification (71111.11)

.1 Biennial Written Examination and Annual Operating Test Results

a. Inspection Scope

The inspectors reviewed the overall pass/fail results of individual written tests, job performance measure operating tests, and simulator operating tests, (required to be given per 10 CFR 55.59(a)(2)), administered by the licensee during calendar year 2003. The overall results were compared with the significance determination process in accordance with NRC Inspection Manual Chapter (IMC) 0609, Appendix I, "Operator Requalification Human Performance Significance Determination Process (SDP)."

b. Findings

No findings of significance were identified.

.2 Resident Inspectors' Quarterly Review

a. Inspection Scope

On August 6, 2003, the inspectors completed one inspection sample by observing and evaluating an operating crew during an "out-of-the-box" requalification examination on the simulator using Scenario "Number BY-70," Revision 0. The inspectors evaluated crew performance in the areas of:

- clarity and formality of communications,
- ability to take timely actions,
- prioritization, interpretation and verification of alarms,
- procedure use,
- control board manipulations,
- supervisor's command and control,
- management oversight, and
- group dynamics.

Crew performance in these areas was compared to licensee management expectations and guidelines as presented in the following documents:

- OP-AA-101-111, "Roles and Responsibilities of On-Shift Personnel," Revision 0,
- OP-AA-103-102, "Watchstanding Practices," Revision 2,
- OP-AA-103-103, "Operation of Plant Equipment," Revision 0,
- OP-AA-103-104, "Reactivity Management Controls," Revision 2, and
- OP-AA-104-101, "Communications," Revision 1.

The inspectors verified that the crew completed the critical tasks listed in the above simulator guide. The inspectors also compared simulator configurations with actual control board configurations. For any weaknesses identified, the inspectors observed the licensee evaluators to verify that they also noted the issues and discussed them in the critique at the end of the session.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12)

a. Inspection Scope

The inspectors completed three inspection samples by evaluating the licensee's implementation of the maintenance rule, Title 10 Part 50.65 of the Code of Federal Regulations (CFR), as it pertained to identified performance problems associated with the following systems:

- Essential service water makeup pumps;
- Unit 2 containment spray system with an additional focus on past maintenance foreign material exclusion practices on both units; and
- Main steam isolation valves and the turbine electric overspeed trip system.

During this inspection, the inspectors evaluated the licensee's monitoring and trending of performance data for the past 2 years, verified that performance criteria were established commensurate with safety, and verified that equipment failures were appropriately evaluated in accordance with the maintenance rule. These aspects were evaluated using the maintenance rule scoping and report documents. For each system, structure, and component reviewed, the inspectors also reviewed the significant work orders and condition reports listed in the Attachment at the end of this report to verify that failures were properly identified, classified, and corrected, and that unavailable time had been properly calculated.

In addition, the inspectors utilized the following references during the completion of their review:

- Regulatory Guide 1.160; Monitoring the Effectiveness of Maintenance at Nuclear Power Plants; Revision 2; and
- NUMARC 93-01; Industry Guideline For Monitoring the Effectiveness of Maintenance at Nuclear Power Plants; Revision 2.

b. Findings

Two findings were identified in this inspection area. The first finding was associated with the failure to specify a critical design dimension in procurement documentation when procuring a resistance temperature detector (RTD) installed into an essential service water (SX) makeup pump assembly. The second finding was associated with the failure to follow procedure when making-up electrolyte level in battery bank cells that supply power to start the diesel engine of an SX makeup pump assembly.

(1) Failure to Specify a Critical Design Dimension in Procurement Documentation

Introduction

A Non-Cited Violation (NCV) of 10 CFR 50 Appendix B having very low safety significance was identified through a self-revealing event. The licensee failed to adequately specify, in procurement documentation, the proper length for a replacement RTD installed into the diesel engine oil pan of the train B SX makeup pump assembly. This resulted in excessive vibration of the RTD during the diesel pump operation such that future operability of the pump to perform its intended safety function could not be assured without removing the RTD. Subsequently, the licensee had to take the diesel driven pump out of service resulting in additional unavailability time to remove the RTD to allow restoration of the pump to an operable status.

Description

In June of 2002 the licensee installed a replacement RTD into the oil pan of train B the diesel driven SX makeup pump. Since the RTD that was being replaced was determined to be obsolete, the licensee procured and qualified a commercially available alternate RTD. On February 5, 2003, during a test of the train B SX makeup pump, the replacement RTD was observed to be vibrating. Subsequent comparison of the RTD to the RTD installed on the train A SX makeup pump diesel engine revealed that the RTD installed in the train B SX makeup pump diesel was longer.

The subject RTD was installed into a threaded well that was welded into the oil pan of the diesel engine of the train B SX makeup pump. Since the licensee observed no oil leaking from the location where the RTD well penetrated the oil pan of the train B pump's diesel engine, the licensee initially considered the train B SX makeup pump operable but requested an evaluation for the long term continued operability. On February 12, 2003, the licensee determined that due to the effect of the vibrating RTD on the diesel, future operability could not be assured. Therefore, the licensee declared the train B SX makeup inoperable and entered the appropriate technical specification limiting condition for operation. The subject RTD needed to be removed to consider the pump operable. The licensee issued a temporary design change to allow the engine to be operated without the RTD and removed the RTD from the well.

The licensee identified that the newer RTD was about 1 and 3/16 inches longer than the original RTD. The RTD itself performs no safety purpose for the train B SX makeup pump assembly but the vibration of the RTD if left installed could have caused the joint between the RTD well and the diesel engine oil pan to leak oil, subsequently causing engine damage. The inspectors later determined that during the evaluation of a replacement RTD the licensee failed to consider the length as a critical design dimension. Because of the mounting configuration of the RTD, the longer length of the replacement RTD caused the excessive vibration during engine operations.

Analysis

The inspectors determined that the failure to specify the length for the replacement RTD resulted in the unnecessary unavailability of the train B SX makeup pump. This was a performance deficiency warranting a significance evaluation in accordance with IMC 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Disposition Screening," issued on June 20, 2003. The inspectors determined that the finding was more than minor since it involved the equipment availability attribute that affected the Mitigating System cornerstone objective regarding the availability of a system that responds to initiating events to prevent undesirable consequence. The inspectors determined that this deficiency affected the cross-cutting area of Human Performance since the licensee did not specify a parameter that was necessary to assure adequate quality of the procured RTD.

The inspectors determined that the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," because the finding was associated with the operability, availability and reliability of a train of a mitigating system. For the Phase 1 screening, the inspectors answered "no" to the questions in

the Mitigating System column, because there was no design deficiency, no actual loss of safety function, no single train loss of safety function for greater than the Technical Specification (TS) allowed outage time, and no risk due to external events. Therefore, the finding was of very low safety significance (Green).

Enforcement

10 CFR 50, Appendix B, Criteria IV, "Procurement Document Control," requires, in part, that measures shall be established to assure regulatory requirements, design bases, and other requirements which are necessary to assure adequate quality are suitably included or referenced in documents for procurement of material, equipment and services. Contrary to the above, on or about March 21, 2002, the effects of RTD overall length were not considered in Procurement Engineering Evaluation 15920 for the replacement RTD installed into the train B SX makeup pump assembly. The licensee issued a temporary design change to allow the engine to be operated without the RTD and removed the RTD from the well. Because of the very low safety significance, this violation was treated as a Non-Cited Violation consistent with Section VI.A of NRC Enforcement Policy (NCV 05000454/2003006-01; 05000455/2003006-01). The licensee entered the problem into its corrective action system as Condition Report 143983, "0B SX Makeup Pump Engine Oil Temperature RTD Vibration," dated February 5, 2003.

(2) Failure to Follow Procedure When Making-Up Electrolyte Level

Introduction

A Non-Cited Violation of TS having very low safety significance was identified through a self-revealing event. The licensee failed to follow procedure for nickel cadmium battery bank surveillances when the licensee added boric acid as a makeup electrolyte solution vice demineralized water into the nickel cadmium battery bank cells that supply power to start the diesel engine of the train B SX makeup pump assembly. This resulted in the licensee declaring the train B diesel driven SX makeup pump inoperable resulting in additional unavailability time to replace the affected batteries.

Description

On July 7, 2003, during the performance of a quarterly nickel cadmium battery surveillance, licensee electricians determined electrolyte level to be low in several of the train B SX diesel driven makeup pump battery cells. The electricians carried three bottles of solution with them: two bottles of demineralized water and one of a boric acid solution. After the electricians filled several battery cells, they realized that they added the boric acid solution into an indeterminate amount of the battery cells instead of the specified demineralized water. The licensee later declared the train B SX makeup pump assembly inoperable.

The licensee tested the pH level in the batteries but the pH was found to be normal. Later the licensee performed an engineering evaluation after consulting with the battery manufacturer that said the batteries could be considered operable for 30 days if cell float voltage was measured daily and remained above a specified limit. Also, battery

charger output was required to be monitored daily for any increasing trend. However, long term operability could not be assured. The licensee implemented these actions and then declared the train B SX makeup pump assembly operable. On July 11, 2003, the licensee again removed the train B SX makeup pump assembly from service taking additional unavailability time to replace all affected batteries.

Analysis

The inspectors determined that the failure to follow procedure while adding makeup electrolyte solution to the battery bank of the train B diesel driven SX makeup pump was a performance deficiency warranting a significance evaluation in accordance with IMC 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Disposition Screening," issued on June 20, 2003. The inspectors determined that the finding was more than minor since it involved the equipment availability attribute that affected the Mitigating System cornerstone objective regarding the availability of a system that responds to initiating events to prevent undesirable consequence. The inspectors determined that this deficiency affected the cross-cutting area of Human Performance because, instead of using demineralized water to makeup electrolyte level in the batteries as required by Step 4.7.1.1 of Maintenance Procedure MA-BY-723-054 "Nickel Cadmium Battery Bank Surveillance," maintenance personnel added a boric acid solution.

The inspectors determined that the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," because the finding was associated with the operability, availability and reliability of a train of a mitigating system. For the Phase 1 screening, the inspectors answered "no" to the questions in the Mitigating System column, because there was no design deficiency, no actual loss of safety function, no single train loss of safety function for greater than the TS allowed outage time, and no risk due to external events. Therefore, the finding was of very low safety significance (Green).

Enforcement

Byron Technical Specification Paragraph 5.4.1(a) requires that written procedures be established, implemented, and maintained covering the applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A. Paragraph 9.a of this guide requires in part that procedures for performing maintenance that can affect the performance of safety-related equipment be properly performed. Contrary to the above, on or about July 7, 2003, Step 4.7.1.1 of Revision 2 of Maintenance Procedure MA-BY-723-054 "Nickel Cadmium Battery Bank Surveillance," was not properly performed because boric acid solution was added to the battery cells to makeup electrolyte level vice the specified demineralized water. Subsequently, the licensee replaced the affected batteries. Because of the very low safety significance, this violation was treated as a Non-Cited Violation consistent with Section VI.A of NRC Enforcement Policy (NCV 05000454/2003006-02; 05000455/2003006-02). The licensee entered the problem into its corrective action system as Condition Report 166546, "Boric Acid Solution Added to 0SX02EB-A Battery Bank," dated July 7, 2003.

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

a. Inspection Scope

The inspectors reviewed the licensee's management of plant risk during emergent maintenance activities or during activities where more than one significant system or train was unavailable. The inspectors chose activities based on their potential to increase the probability of an initiating event or impact the operation of safety-significant equipment. The inspectors verified that the evaluation, planning, control, and performance of the work were done in a manner to reduce the risk and the work duration was minimized where practical. The inspectors also verified that contingency plans were in place where appropriate.

The inspectors reviewed configuration risk assessment records, UFSAR, TS and Individual Plant Examination. The inspectors also observed operator turnovers, observed plan-of-the-day meetings, and reviewed the documents listed in the Attachment at the end of this report to verify that the equipment configurations had been properly listed, that protected equipment had been identified and was being controlled where appropriate, and that significant aspects of plant risk were being communicated to the necessary personnel. The inspectors verified that the licensee controlled work activities in accordance with the following:

- Nuclear Station Procedure (NSP) WC-AA-101, "On-Line Work Control Process," Revision 6;
- NSP ER-AA-600; Risk Management; Revision 2;
- NSP ER-AA-310; Implementation of the Maintenance Rule; Revision 2;
- NSP WC-AA-101; On-line Work Control Process; Revision 6; and
- Byron Operating Department Policy 400-47; April 7, 2001, Revision 2.

The inspectors completed seven inspection samples by reviewing the following activities:

- Simultaneous planned work on the Unit 2 containment spray train B and emergent continuation of control room ventilation chiller work on July 15, 2003;
- Emergent inoperability of the Unit 2 train A auxiliary feedwater pump due to erratic suction pressure indications on August 6, 2003;
- Unit 0 component cooling water heat exchanger work window concurrent with Unit 0 auxiliary building ventilation system exhaust fan outages on August 11, 2003;
- Unit 1 train B centrifugal charging pump out of service concurrent with auxiliary building ventilation supply fan C out of service on September 3, 2003;
- Emergent unavailability of Unit 2 train B emergency diesel generator on September 12, 2003;
- Unit 1 shutdown risk at various times through the end of the quarter, September 30, 2003; and
- Crosstie of DC bus 211 to 111 concurrent with bus 141 outage on September 30, 2003.

b. Findings

No findings of significance were identified.

1R14 Personnel Performance Related to Non-routine Plant Evolutions and Events (71111.14)

a. Inspection Scope

The inspectors completed two inspection samples by observing and evaluating control room operators during the following non-routine evolutions:

- Unit 2 loss of moisture separator reheaters during performance on the turbine oil trip surveillance on August 13, 2003; and
- Unit 1 shutdown for the twelfth Unit 1 refueling outage (B1R12).

The inspectors evaluated crew performance in the areas of:

- clarity and formality of communications,
- prioritization, interpretation and verification of alarms,
- procedure use,
- control board manipulations,
- supervisor's command and control,
- management oversight, and
- group dynamics.

Crew performance in these areas was compared to licensee management expectations and guidelines as presented in the following documents:

- OP-AA-101-111, "Roles and Responsibilities of On-Shift Personnel," Revision 0,
- OP-AA-103-102, "Watchstanding Practices," Revision 2,
- OP-AA-103-103, "Operation of Plant Equipment," Revision 0,
- OP-AA-103-104, "Reactivity Management Controls," Revision 2,
- OP-AA-104-101, "Communications," Revision 1,
- 2BOSR TS-Q-1, "Unit 2 Turbine Oil Trips Quarterly Surveillance," Revision 2, and
- 1BGP100-4, "Power Descension," Revision 28.

The inspectors also reviewed selected issues documented in Condition Reports (CRs), to determine if they had been properly addressed in the licensee's corrective action program. The documents reviewed during this inspection are listed in the Attachment to this report.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope

The inspectors evaluated plant conditions, selected condition reports, engineering evaluations and operability determinations for risk-significant components and systems in which operability issues were questioned. These conditions were evaluated to determine whether the operability of components was justified.

The inspectors completed six inspection samples by reviewing the following evaluations and issues:

- Engineering Change 343864; “Evaluation of voiding in containment spray pump eductor lines on July 2, 2003”;
- Engineering Change 341886; “Estimated of 2SX114B operating torque required to isolate containment chiller”;
- Condition Report 175115; “Unit 2B diesel generator failed to start during semi-annual engineered safety features relay surveillance”;
- Operability Determination 03-001; “Condensate storage tank level inadequate using current emergency procedures,” Revision 2, June 23, 2003;
- Operability Determination 03-005; “1A containment spray pump oil leak, September 12, 2003"; and
- Operability Determination 03-004; “Non-safety related positioners on safety related valves,” September 16, 2003.

The inspectors compared the operability and design criteria in the appropriate section of the TS including the TS Basis, the technical requirements manual (TRM) and UFSAR to the licensee’s evaluations to verify that the components or systems were operable. The inspectors determined whether compensatory measures, if needed, were taken, and determined whether the evaluations were consistent with the requirements of licensee’s Procedure LS-AA-105, “Operability Determination Process,” Revision 0. The inspectors also discussed the details of the evaluations with the shift managers and appropriate members of the licensee’s engineering staff.

In addition, the inspectors utilized the following references during the completion of their review:

- NRC Inspection Manual Part 9900: Technical Guidance; Operable/Operability: Ensuring the Functional Capability of a System or Component;
- NRC Inspection Manual Part 9900: Technical Guidance; Resolution of Degraded and Nonconforming Conditions; October 8, 1997; and
- NRC Generic Letter No 91-18, Revision 1; Information to Licensees Regarding NRC Inspection Manual Section on Resolution of Degraded and Nonconforming Conditions.

The documents listed in the Attachment at the end of the report were used in the assessment of this area.

b. Findings

No findings of significance were identified.

1R17 Permanent Plant Modifications (Annual) (71111.17A)

a. Inspection Scope

The inspectors did not complete an inspection sample; however, the inspectors reviewed selected issues documented in CRs, to determine if they had been properly addressed in the licensee's corrective action program. The documents reviewed during this inspection are listed in the Attachment to this report.

b. Findings

No findings of significance were identified.

1R19 Post Maintenance Testing (71111.19)

a. Inspection Scope

The inspectors reviewed the post maintenance testing activities associated with maintenance or modification of mitigating, barrier integrity, and support systems that were identified as risk significant in the licensee's risk analysis. The inspectors reviewed these activities to verify that the post maintenance testing was performed adequately, demonstrated that the maintenance was successful, and that operability was restored. During this inspection activity, the inspectors interviewed maintenance and engineering department personnel and reviewed the completed post maintenance testing documentation. The inspectors used the appropriate sections of the TS, TRM and UFSAR, as well as the documents listed in the Attachment at the end of this report, to evaluate this area. The inspectors verified that the licensee controlled post maintenance testing in accordance with the following:

- Byron Administrative Procedure (BAP) 1600-11; Work Request Post Maintenance Testing Guidance; Revision 12; and
- NSP MA-AA-716-012; Post Maintenance Testing; Revision 0.

The inspectors completed four inspection samples by observing and evaluating the post maintenance testing subsequent to the following activities:

- Unit 0 train B control room ventilation system following removal of essential service water valve 0SX063B internals on August 14, 2003;
- Unit 2 train B containment spray system post maintenance test review following maintenance on August 15, 2003;
- Stroke time test of Unit 1 A steam generator power operated relief valve following actuator work on August 26, 2003; and
- Unit 2 train B emergency diesel generator post maintenance test review following maintenance on September 10 through 12, 2003.

The inspectors also reviewed selected issues documented in CRs, to determine if they had been properly addressed in the licensee's corrective action program.

b. Findings

No findings of significance were identified.

1R20 Refueling & Outage Activities (71111.20)

a. Inspection Scope

The inspectors observed the licensee's performance during Refueling Outage B1R12 beginning September 23, 2003, and continuing through the end of the quarter. Since the outage was ongoing at the end of the quarter, these inspection activities represent only a partial completion of one inspection sample. The inspection sample will be completed in the next quarterly inspection period.

The inspectors evaluated the licensee's conduct of refueling outage activities to assess the licensee's control of plant configuration and management of shutdown risk. The inspectors reviewed configuration management to verify that the licensee maintained defense-in-depth commensurate with the shutdown risk plan; reviewed major outage work activities to ensure that correct system lineups were maintained for key mitigating systems; and observed refueling activities to verify that fuel handling operations were performed in accordance with the TS, TRM, UFSAR and approved procedures. The inspectors interviewed operations, engineering, work control, radiological protection, and maintenance department personnel during their inspection activities. The inspectors also attended outage-related status and pre-job briefings as well as Radiation Protection ALARA [As Low As Reasonable Achievable] briefings. Other major outage activities evaluated included evaluating the licensee's control of:

- containment penetrations in accordance with the TS;
- structures, systems or components (SSCs) which could cause unexpected reactivity changes;
- flow paths, configurations, and alternate means for reactor coolant system (RCS) inventory addition;
- SSCs which could cause a loss of inventory;
- RCS pressure, level, and temperature instrumentation;
- spent fuel pool cooling during and after core offload;
- switchyard activities and the configuration of electrical power systems in accordance with the TS and shutdown risk plan; and
- SSCs required for decay heat removal.

The inspectors observed portions of the plant cooldown, including the transition to shutdown cooling, to verify that the licensee controlled the plant cooldown in accordance with the TS. In addition, the inspectors evaluated portions of the core reload activities using core loading plan CAC-03-75 for Byron Unit 1 cycle 13.

In addition, the inspectors completed numerous visual inspections inside the Unit 1 containment. This included a tour of the Unit 1 containment at Mode 3 during the

cooldown at the beginning of B1R12 so that the inspectors could assess the initial material condition of equipment inside containment immediately following the operating cycle. During the visual inspections the inspectors focus on the material condition of the equipment and particularly on any indication of boric acid.

The inspectors also reviewed selected issues documented in CRs, to determine if they had been properly addressed in the licensee's corrective action program. The documents reviewed during this inspection are listed in the Attachment to this report.

b. Findings

No findings of significance were identified. However, on October 1, 2003, a special inspection was initiated to examine the facts and circumstances surrounding a Unit 1 fuel handling incident on September 26, 2003, where the mast of the fuel handling machine made contact with the rod cluster control assembly change fixture basket in the fuel transfer cavity. The details of that inspection are documented in Inspection Report 05000454/2003008.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

The inspectors witnessed selected surveillance testing and/or reviewed test data to verify that the equipment tested using the surveillance procedures met the TS, the TRM, the UFSAR, and licensee procedural requirements, and demonstrated that the equipment was capable of performing its intended safety functions. The activities were selected based on their importance in verifying mitigating systems capability and barrier integrity. The inspectors used the documents listed in the Attachment at the end of this report to verify that the testing met the frequency requirements; that the tests were conducted in accordance with the procedures including establishing the proper plant conditions and prerequisites; that the test acceptance criteria were met; and that the results of the tests were properly reviewed and recorded. In addition, the inspectors interviewed operations, maintenance and engineering department personnel regarding the tests and test results.

The inspectors completed five inspection samples by observing and evaluating the following surveillance tests:

- Unit 1 train B emergency diesel generator monthly surveillance on July 10, 2003;
- Unit 1 train B diesel driven auxiliary feedwater pump ASME surveillance on August 14, 2003;
- Unit 1 train A containment spray additive flow rate surveillance conducted on August 19, 2003;
- Unit 1 component cooling system local leak rate testing conducted on September 25, 2003; and
- Unit 1 safety injection check valve stroke test conducted on September 25, 2003.

The inspectors also reviewed selected issues documented in CRs, to determine if they had been properly addressed in the licensee's corrective action program.

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications (71111.23)

a. Inspection Scope

The inspectors completed one inspection sample by evaluating the following temporary plant modification on risk-significant equipment:

- Engineering Change 342775, Revision 1, for establishment of a freeze seal for work activities on valve 1SX124B on September 2, 2003.

The inspectors reviewed this temporary plant modification to verify that the instructions were consistent with applicable design modification documents and that the modification did not adversely impact system operability or availability. The inspectors interviewed operations, engineering and maintenance personnel as appropriate and reviewed the design modification documents and the 10 CFR 50.59 evaluations against the applicable portions of the UFSAR and TS. The documents listed in the Attachment at the end of this report were also used by the inspectors to evaluate this area. The inspectors verified that the licensee controlled temporary modifications in accordance with NSP CC-AA-112; Temporary Configuration Changes; Revision 6.

The inspectors also reviewed selected issues documented in CRs, to determine if they had been properly addressed in the licensee's corrective action program.

b. Findings

No findings of significance were identified

## 2. RADIATION SAFETY

### Cornerstone: Occupational Radiation Safety (OS)

2OS1 Access Control to Radiologically Significant Areas (71121.01)

.1 High Risk Significant, High Dose Rate (HDR) Locked High Radiation Areas (LHRA) and Very High Radiation Areas (VHRA)

a. Inspection Scope

The inspectors reviewed the station's implementation of physical and administrative controls over access to HDR LHRAs and VHRAs, including a discussion of these controls with Radiation Protection (RP) supervisors and lead RP Technicians, to verify that processes and procedures (including any recent changes) implementing these controls provided an appropriate level of worker protection. The inspectors also conducted walkdowns of all accessible LHRA boundaries to verify adequate posting and locking of all entrances into these areas.

These reviews represented three completed samples.

b. Findings

No findings of significance were identified.

.2 Identification and Resolution of Problems

a. Inspection Scope

The inspectors reviewed CRs initiated since January 2003 and a November 2002 focus-area self-assessment which focused on access control to radiologically significant areas. The inspectors reviewed these documents to assess the licensee's ability to identify repetitive problems, contributing causes, the extent of conditions, and implement corrective actions intended to achieve lasting results.

These reviews represented two completed samples.

b. Findings

Introduction: A self-revealing Green finding and an associated NCV were identified when a station laborer failed to comply with a radiological posting controlling access into the Radiologically Controlled Area (RCA) of the station, and subsequently violated several aspects of the licensee's procedure controlling the unescorted access into the area.

Description: On July 14, 2003, a station laborer was given instructions to deliver an order of food from the Service Building to the Technical Support Center (TSC) on the 451' elevation of the Turbine Building. The laborer had not previously been to the TSC but was familiar with the location of the Turbine Building elevator, and thus he was provided with directions to the TSC using the elevator as a landmark. However, the laborer misinterpreted the directions provided to him, which resulted in him walking down a stairway near the main control room used as an alternative/emergency only ingress point to the RCA. On the 426' elevation of the stairway, a crashdoor was posted with a single RP posting of "CAUTION RADIOACTIVE MATERIAL; RWP REQUIRED FOR ENTRY; ED [electronic dosimetry] and TLD [thermoluminescent dosimeter] REQUIRED FOR ENTRY; NO EATING, DRINKING, OR SMOKING PERMITTED." However, the laborer apparently failed to read and comply with the posting, and proceeded through the door which closed and locked behind him. At this point, the individual became aware that he was not familiar with his surroundings. Therefore, because a phone was not available in the stairway to call for help, the laborer continued down the stairs to the 401' elevation (the ground elevation) and walked toward the Auxiliary Building RP Control Point. The event was self-revealing when, as the laborer approached, the RP technician at the Control Point noticed that the laborer was not wearing a TLD or an ED and possessed food while inside the Radiologically Controlled Area. The RP technician immediately took control of the situation and began an investigation which included conducting radiological surveys of the path the laborer took in arriving at the Control Point.

The laborer in question worked in non-radiologically controlled areas of the station, and thus had received the Nuclear General Employee Training (NGET) at the station, but he was not Radiation Worker trained. As such, the laborer was not authorized to enter the RCA, had not signed in on an appropriate Radiation Work Permit (RWP) [nor was he authorized to do so], and had not been issued a TLD or ED.

Analysis: The inspectors determined that the issue was associated with the "Human Performance" attribute of the Occupational Radiation Safety Cornerstone and affected the cornerstone objective in ensuring adequate protection of worker health and safety from exposure to radiation from radioactive material. The cornerstone objective was affected because the RCA boundary posting violated by the laborer represents the final radiation exposure barrier in the field for those workers who are not normally authorized to enter the RCA. Also, the issue involved the occurrence of an individual worker's potential unplanned, unintended dose resulting from actions contrary to licensee procedures. Therefore, the issue was more than minor and represents a finding which was evaluated using the SDP for the Occupational Radiation Safety Cornerstone.

The inspectors determined that the laborer's failure to read and comply with the radiological posting resulted in his unauthorized entry into the RCA without the appropriate additional radiological controls (Radiation Worker Training, RWP, TLD, and ED). The inspectors further determined that the NGET training the laborer had received contained extensive discussions (including visual aids) related to reading and complying with radiological postings, recognizing radiological boundaries, and fundamental rules related to radiation protection. As such, the inspectors determined utilizing IMC 0609, Appendix C, "Occupational Radiation Safety SDP," that the finding did not involve ALARA/work controls and there was not an overexposure. Further, based on the surveys of the areas the laborer could have encountered while on the 401' elevation of the RCA, the inspectors determined that there was not a substantial potential for an overexposure nor was the licensee's ability to assess dose compromised. Consequently, the inspectors concluded that the SDP assessment for this finding was of very low safety significance (Green).

Enforcement: Technical Specification 5.4.1 requires, in part, that procedures be established, implemented and maintained that cover the activities recommended in Regulatory Guide 1.33, Revision 2, Appendix A, which includes procedures for controlling access to radiological areas. Procedure BRP 5000-7, "Unescorted Access to and Conduct in Radiologically Controlled Areas," Section 4.2, requires, in part, that persons gaining unescorted access into an RCA shall have: (1) authorization from cognizant work supervision; (2) valid Radiation Worker Training; (3) been issued a routine TLD and at least one secondary dosimeter (e.g., an ED); and (4) read, understood, and signed an appropriate RWP. The failure of the laborer to obtain these requisites of Section 4.2 of BRP 5000-7 prior to his entry in to the RCA was a violation of Technical Specification 5.4.1. However, because the licensee has documented this issue in its corrective action program (CR 00167515) and the violation was of very low safety significance, it was treated as a Non-Cited Violation (NCV 05000454/2003006-03; 05000455/2003006-03).

.3 Radiation Worker Performance and RP Technician Proficiency

a. Inspection Scope

The inspectors searched the licensee's CR database and reviewed a variety of CRs initiated since January 2003 which indicated that the cause of the issue was due to either radiation worker or RP technician error. The inspectors reviewed these documents to determine if there was an observable pattern traceable to common cause(s), and, if so, the licensee's corrective actions addressed these common issue(s) in an appropriate and timely manner.

These reviews represented two completed samples.

b. Findings

No findings of significance were identified.

2OS3 Radiation Monitoring Instrumentation and Protective Equipment (71121.03)

.1 Respiratory Protective Equipment, including Self-Contained Breathing Apparatus Maintenance and User Training

a. Inspection Scope

The inspectors reviewed aspects of the licensee's respiratory protection program for compliance with the requirements of Subpart H of 10 CFR Part 20, to ensure that self-contained breathing apparatus (SCBA) were properly maintained and stored, and to ensure that personnel required to don SCBAs were qualified.

Specifically, the inspectors reviewed selected surveillance records for SCBAs staged and ready for use in the following locations:

- Main Control Room,
- Operations Support Center,
- Technical Support Center,
- 401' Elevation Fire Brigade Cage, and
- 401' Elevation Confined Space Rescue Team Storage Area.

The inspectors also performed walkdowns of the SCBAs in these locations and inspected a sample of the units to assess the material condition of the equipment, and to verify the air cylinders had the appropriate Department of Transportation markings and composite cylinder hydrostatic tests in the last 3 years. The inspectors also observed the operation of the station's air compressor/cascade system used to refill SCBA air cylinders during the quarterly vendor sampling of the system and reviewed the analysis of the sample to verify that the cylinder air meets or exceeds the Grade D specifications described in Compressed Gas Association Pamphlet G-7.1-1997.

Since the last inspection of this area in 2001, the station replaced its inventory of SCBA units with newer models. As such, the inspectors reviewed and discussed the station's current SCBA vendor maintenance program with the program owner, reviewed the 2002 maintenance documentation for each of the five SCBA units visually inspected, and

reviewed vendor personnel qualification documentation to verify that individuals conducting maintenance on the SCBAs were trained and qualified in accordance with the manufacturer's recommendations.

In addition, the inspectors conducted a 100 percent sample of the licensee's current training, fit test, and medical qualification records to verify that applicable emergency response, fire brigade, and control room personnel were currently trained and qualified for the use of respiratory protection (including SCBAs) in accordance with the licensee's Emergency Plan. The inspectors observed a class of RP technicians undergoing refresher Level 2 Respiratory Protection Training (specific for SCBA use) to verify that the training included hands-on learning with respect to donning, doffing, bottle change out, and response to the SCBA units' visual and audible alarms.

Finally, the inspectors reviewed the licensee's respiratory protection and confined space entry procedures and discussed their implementation relative to the requirements of 10 CFR 20.1703(f) for standby rescue persons whenever one-piece atmosphere supplying suits, or any combination of respiratory protection and personnel protective equipment were used which the wearer may have difficulty extricating himself. Specifically, the inspectors reviewed the licensee's work planning process and implementing practices, and interviewed RP staff regarding the following aspects of 10 CFR 20.1703: (1) designation of an adequate number of standby rescue workers and their training/instruction; (2) presence of equipment staged at the work site for the safety of the rescuer and for extrication of the respiratory equipment user; (3) practices for continuous communication between standby rescuer(s) and the respiratory protection user(s); and (4) provisions for immediate availability of the standby rescuer.

These reviews represented two completed samples.

b. Findings

No findings of significance were identified.

.2 Identification and Resolution of Problems

a. Inspection Scope

The inspectors reviewed licensee CRs and two focus-area self-assessments related to the SCBA and respiratory protection programs generated in calendar years 2001 - 2003. The inspectors reviewed these documents to assess the licensee's ability to identify repetitive problems, contributing causes, the extent of conditions, and implement corrective actions intended to achieve lasting results.

These reviews represented one completed sample.

b. Findings

No findings of significance were identified.

## 4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

**Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, Occupational Radiation Safety, and Physical Protection**

.1 Reactor Safety Strategic Area

a. Inspection Scope

The inspectors sampled the licensees submitted materials for performance indicators (PIs) and periods listed below. Each bullet represents two completed samples, one each for Units 1 and 2. The inspectors used PI definitions and guidance contained in Revision 2 of Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline" to verify the accuracy of the PI data. The following four PIs were reviewed for each unit (8 samples):

- safety system unavailability for the residual heat removal system (July 2002 through June 2003);
- safety system unavailability for high pressure safety injection (July 2002 through June 2003);
- safety system functional failures (July 2002 through June 2003); and
- reactor coolant system leakage (July 2002 through June 2003).

The inspectors reviewed selected applicable conditions and data from logs, licensee event reports and CRs from July 2002 through June 2003 for each PI area specified above. The inspectors independently reperformed calculations where applicable. The inspectors compared that information to the information required for each performance indicator definition in the guideline to ensure that the licensee reported the data accurately.

b. Findings

No findings of significance were identified.

.2 Radiation Safety Strategic Area

a. Inspection Scope

The following PI was reviewed:

- Occupational Radiation Safety

The inspectors reviewed the licensee's assessment of its PI to determine if indicator related data was adequately assessed and reported. Since no reportable events were identified by the licensee for the 3rd quarter of calendar year 2002 through the 2nd quarter of calendar year 2003, the inspectors compared the licensee's data with the CR database and RCA exit electronic dosimetry transaction records for these time periods to verify that there were no unaccounted for occurrences in the Occupational Radiation Safety PI as defined by the applicable revision of Nuclear Energy Institute

Document 99-02. Additionally, as discussed in Section 2OS1.1, the inspectors conducted walkdowns of accessible LHRA entrances to verify the adequacy of controls in place for these areas.

These reviews represented one sample completed for IP 71151 and two completed samples for IP 71121.01.

b. Findings

No findings of significance were identified.

.3 Clarification of Previously Reviewed Performance Indicators

The inspectors noted that the performance indicators reviewed were not clearly stated in a previous inspection report. Therefore, the following clarification is provided:

- For inspection report 05000454/2003003; 05000455/2003003, the inspectors reviewed the following performance indicators for both Unit 1 and Unit 2:
  - unplanned scrams per 7000 critical hours;
  - unplanned power changes per 7000 critical hours;
  - scrams with loss of normal heat removal; and
  - reactor coolant system specific activity.

4OA2 Identification and Resolution of Problems (71152)

Routine Review of Identification and Resolution of Problems

a. Inspection Scope

As discussed in previous sections of this report, the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify that they were being entered into the licensee's corrective action system at an appropriate threshold, that adequate attention was being given to timely corrective actions, and that adverse trends were identified and addressed. Minor issues entered into the licensee's corrective action system as a result of inspectors' observations are generally denoted in the list of documents reviewed at the back of the report.

b. Findings

No findings of significance were identified.

4OA3 Event Follow-up (71153)

.1 (Closed) Licensee Event Report (LER) 50-454/2002-001-02: Multiple Main Steam Safety Valve (MSSV) Relief Tests Exceeded Required Tolerance Due to Disk to Nozzle Metallic Bonding and Setpoint Drift: This LER supplement provided new information associated with the most recent mid-cycle test results of Unit 1 MSSVs from the spring of 2003. All six Unit 1 valves tested passed without disk bonding. These test results are being factored into the licensee's ongoing evaluation of this issue. The inspectors reviewed this LER supplement and no findings of significance were identified. The original LER was reviewed by the NRC in Inspection Report 50-454/02-05 and Supplement 1 to the LER was reviewed in Inspection Report 50-454/02-07. Supplement 2 of the LER did not raise any new issues or change the conclusions of the initial reviews. This LER supplement is closed.

.2 (Closed) LER 50-454/2003-002-01: Two Main Steam Safety Valves Lift Setpoints Found Out of Tolerance During Testing Due to Unknown Causes: The licensee submitted Supplement 1 to LER 05000454/2003-002 to provide additional information regarding the MSSV testing methodology. The inspectors reviewed the information provided in Supplement 1 to LER 05000454/2003-002. Supplement 1 of the LER did not raise any new issues or change the conclusions of the initial review which is documented in NRC Inspection Report 50-454/2003-003. This LER supplement is closed.

4OA4 Cross-Cutting Aspects of Findings

.1 Two findings identified in Section 1R12 of this report had as their primary causes human performance deficiencies.

a. The finding concerning the failure to specify a critical design dimension in procurement documentation had as its primary cause a human performance deficiency because the licensee should have determined that length was a critical design dimension worthy of specification in the procurement documents. The mounting position of the RTD into the diesel engine oil pan was readily observable and the diesel engine vibrated during operation.

b. The finding concerning the failure to follow procedure when making-up electrolyte level had as its primary cause a human performance deficiency since the licensee procedure specified demineralized water to be used as makeup electrolyte and boric acid solution was used instead.

.2 A finding identified in Section 2OS1 had as its primary cause a human performance deficiency because a station laborer failed to read and comply with the radiological posting prior to his entry into a RCA without the appropriate additional radiological controls.

40A5 Other Activities

(Closed) URI 05000454/2003004-04;05000455/2003004-04: Auxiliary Feedwater Recirculation Line Valves Not in Inservice Testing Program.

The inspectors concern as to whether the auxiliary feedwater recirculation line valves performed a safety function that would require their inclusion in the inservice testing program was reviewed by the Office of Nuclear Reactor Regulation (NRR). The licensee relied on maintaining an open flow path to the steam generators rather than a flow path through the recirculation line for protecting the pumps from being operated at shutoff head. This methodology was considered acceptable by NRR. As such, the valves in the recirculation line did not perform a safety function that would require the valves to be included in the licensee's inservice testing program. Based on this evaluation, this Unresolved Item is considered closed.

4OA6 Meetings

.1 Exit Meeting

The inspectors presented the inspection results to Mr. S. Kuczynski and other members of licensee management at the conclusion of the inspection on October 14, 2003. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

.2 Interim Exit Meetings

Interim exits were conducted for:

- Occupational Radiation Safety protective equipment and access control programs inspection with Mr. D. Hoots on July 25, 2003.

- Licensed Operator Requalification 7111.11B with Mr. P. Adams, Operations Training Manager on September 18, 2003, via telephone.

.3 Public Meeting on Exceeding Thermal Power Limits

As discussed in inspection report 50-454/03-02, the inspectors were concerned that Unit 1 was operating at above its licensed thermal power limits. On August 28, 2003, after evaluation and comparison between newly installed precision flow measurement instrumentation on the common feedwater header in Unit 1, the licensee identified an error in previously installed ultrasonic feedwater flow measurement instrumentation used in the calorimetric calculation for reactor power. Because of the discrepancy on Unit 1, an investigation was conducted on Unit 2 revealing a similar issue. The licensee concluded that the units had operated at power levels above their licensed thermal power limits. On September 18, 2003, a public meeting was held in the Region III office with the Exelon Corporate and Byron Station management. The purpose of the meeting was to discuss the root cause, immediate corrective actions and investigation of the overpower condition. A meeting will be held in the near future to discuss the licensee's evaluation of their decisions made during the past year regarding this issue.

**ATTACHMENT: SUPPLEMENTAL INFORMATION**

## SUPPLEMENTAL INFORMATION

## KEY POINTS OF CONTACT

Licensee
S. Kuczynski, Site Vice President
D. Hoots, Plant Manager
B. Adams, Engineering Director
P. Adams, Operations Training Manager
D. Combs, Site Security Manager
D. Goldsmith, Radiation Protection Director
W. Grundmann, Regulatory Assurance Manager
B. Youman, Maintenance Manager
S. Kerr, Chemistry Manager
R. Kolo, Training Manager
R. Krohn, Security Analyst
S. Leach, Radiation Protection Instrument Coordinator
M. Mareth, Site Security Force Manager, TWC
M. Snow, Work Management Director
E. Steinke, Chemistry
S. Stimac, Operations Manager
D. Thompson, Lead HP Technical

Nuclear Regulatory Commission
A. Stone, Chief, Projects Branch 3, Division of Reactor Projects

## LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

| | | |
|---|---|---|
| 05000454/2003006-01<br>05000455/2003006-01 | NCV | Failure to Specify a Critical Design Dimension in Procurement Documentation (Section 1R12) |
| 05000454/2003006-02<br>05000455/2003006-02 | NCV | Failure to Follow Procedure When Making-Up Electrolyte Level (Section 1R12) |
| 05000454/2003006-03<br>05000455/2003006-03 | NCV | Failure to Comply with Radiological Posting Resulting in Unauthorized Entry into the Radiologically Controlled Area (Section 2OS1) |

Closed

| | | |
|---|---|---|
| 05000454/2002001-02 | LER | Multiple Main Steam Safety Valve (MSSV) Relief Tests Exceeded Required Tolerance Due to Disk to Nozzle Metallic Bonding and Setpoint Drift |

| | | |
|---|---|---|
| 05000454/2003002-01 | LER | Control Room Ventilation System Alignment Results in Inoperable Radiation Monitors Without Taking Required Actions per the Technical Specifications |
| 05000454/2003004-04; 05000455/2003004-04 | URI | Auxiliary Feedwater Recirculation Line Valves Not in Inservice Testing Program |

Discussed

| | | |
|---|---|---|
| 50-454/03-02-03 | URI | Evaluation for Unit 1 potentially exceeding licensed thermal power limits |

## LIST OF DOCUMENTS REVIEWED

The following is a list of documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspectors reviewed the documents in their entirety but rather that selected sections or portions of the documents were evaluated as part of the overall inspection effort. Inclusion of a document on this list does not imply NRC acceptance of the document or any part of it, unless this is stated in the body of the inspection report.

1R04 Equipment Alignment

BOP CC-E1; Component Cooling System Electrical Lineup (Unit 1), Revision 5
BOP CC-E2; Component Cooling System Electrical Lineup (Unit 2), Revision 3
BOP CC-M1; Component Cooling System Valve Lineup, Revision 24
BOP CC-M2; Component Cooling System Valve Lineup, Revision 19
BOP CS-M2C; Containment Spray System Train C Valve Lineup, Revision 2
BOP CS-M2A; Containment Spray System Train A Valve Lineup, Revision 1
BOP CS-E2A; Containment Spray System Train A Electrical Lineup Unit 2, Revision 1

1R05 Fire Protection

CR 147736; Part 21 Rockbestos Cable Resin; March 06, 2003
CR 179142; Compliance with Hot Work Permit Procedure OP-AA-201-004; October 3, 2003 (NRC Identified)

1R12 Maintenance Effectiveness

CR 143983; 0B Essential Service Water (SX) Makeup Pump Engine Oil Temperature Resistance Temperature Detector (RTD) Vibration
Engineering Change (EC) 341136; Remove RTD 0TE-SX176B From 0B SX Makeup Pump, Revision 0
EC 341137, Operability of the 0B SX Makeup Pump With the 0TE-SX176B Removed and Thermowell NDE Completed
Procurement Engineering Evaluation 15920

Byron Facility Evaluation 23805; Resistance Temperature D, Platinum, 100 Ohm, 4 Wire Single Element
Exelon Evaluation 23954; This Evaluation Establishes Procurement and Commercial Grade
MA-BY-723-054; Nickel Cadmium Battery Bank Surveillance, Revision 2
CR 162399; Adverse Conditions Observed During 0B SX Makeup Pump Repair, June 10, 2003
CR 142997; Problems Encountered During 0B SX Makeup Pump Post Maintenance Testing (PMT) Run, February 10, 2003
CR 147441; Abnormal Start of 0B SX Makeup Pump, March 4, 2003
CR 162400; 0B SX Makeup Engine Failed to Shutdown via Normal Methods, June 8, 2003
CR 149004; Broken Wire on OLS-SX097, March 17, 2003
CR 149094; 0B SX Makeup Pump Fuel Oil Sample Had High Particulate, December 11, 2002
CR 138471; 0B SX Makeup Pump Right Angle Gear Drive Seal Leakage, January 9, 2003

1R13 Maintenance Risk Assessments And Emergent Work Control

CR 170596; Unplanned LCOAR Entry 2A Auxiliary Feed Pump; August 6, 2003
6E-2-4031AF13; Loop Schematic Diagram Auxiliary Feedwater Pump Suction Pressure Cab. 2PA33J; Revision C

1R14 Personnel Performance During Non-Routine Evolutions

CR 138063; Unit 2 Reactor Coolant System Lithium - Action Level A Entry; January 3, 2003
Byron's Archival Operations Narrative Logs; August 13, 2003;
Prompt Investigation Report for CR 171375; Loss of Moisture Separator Reheaters During Conduct of 2BOSR TS-Q1 Turbine Oil Trips Quarterly Surveillance;
CR 171375; Auto Stop Oil Depressurization / Moisture S Separator Reheater Offline During 2 TS-Q1

1R15 Operability Evaluations

Apparent Cause Evaluation; 2SX 114B Actuator Stem Separated From the Valve Coupling; August 4, 2003
CR 133557; Condensate Storage Tank Level Design Basis Concern; November 30, 2002
CR 140761; Current BEPs Do Not Support the Intent of Condensate Storage Tank TS Basis 3.7.6; January 23, 2003
CR 150224; 2SX114B Valve Actuator Found Not Connected to Valve Coupling; March 21, 2003
CR 16231; Station Procedure BOP RH-6 Limitation Without Design Basis; June 11, 2003
CR 164058; Apparent Cause Evaluation Rejected by MRC (Maintenance); June 19, 2003
CR 165234; Ultimate Heat Sink Handshake With Condensate Storage Tank Limiting Design Basis; June 27, 2003

CR 175115; 2B DG Failed to Start During Semi-Annual ESF Relay Surveillance
EC 341886; Estimate of 2SX114B Operating Torque Required to Isolate Containment Chiller; April 10, 2003
EC 343705; Evaluation of Installed Positioner on 2RH618 to Determine if it Meets the Commercial Grade Dedication Requirements of Passport Evaluations 23853 & 23854
CR 170374; Power Uprate Submittal and SER Use Incorrect AF Hold Time; August 5, 2003 (NRC Identified)
2BCSR 1.F.2-1; Unit 2 Borated Water Sources - Operating/Shutdown - Weekly; July 31, 2003
1BCSR 1.F.2-1; Unit 1 Borated Water Sources - Operating/Shutdown - Weekly; July 31, 2003
BOP RH-6; Operation of the RH System in Shutdown Cooling; Revision 27
1BEP ES-0-1; Reactor Trip Response; Revision 101
1BEP ES-0.2; Natural Circulation Cooldown Unit 1; Revision 100
1BEP-0; Reactor Trip or Safety Injection Unit 1; Revision 104

1R17 Permanent Plant Modifications

CR 133417; Replacement Pressure Gauge Installed Without Evaluation; November 27, 2003

1R19 Post Maintenance Testing

CR 109848; Post Maintenance Testing (PMT) Program; May 29, 2002
CR 114945; Review of PMTs to ensure they are correct and complete; July 9, 2002
CR 133103; PMT identified per 79601 was not performed
CR 164051; Vague PMT instructions; June 19, 2003
CR 120928; Concern Relating to PMT Performed on 2VP01CA and 2VP01CC; August 28, 2002
CR 111905; 2B RCFC LCOAR Delayed Due to PMT Not Specified and Scheduled
CR 151300; Unit 2 Pressurizer Level Alarm Card Replacement and Required PMT

1R20 Refueling and Outage Activities

RP-AP-460; Access to Reactor Incore Sump Area; Revision 1
CR 154512; CRDM Housing Boric Acid Deposits; April 17, 2003
CR 149869; Recent Events with RCP Motor Replacements Could Impact B1R12; March 19, 2003
CR 126682; Mode Change to Mode 4 Doesn't Check 1 / 2AR11/12 Monitors; October 10, 2003
CR 122675; Response to UFSAR Question 212.131; September 12, 2002
CR 125828; Possible Inappropriate Change in Shutdown Risk; October 03, 2003
CR 124775; Leakage Points Discovered on the Reactor Cavity Boot Seal; September 27, 2002
EC 341739; Acceptability of Boric Acid Residue in Unit 1 Containment Following B1F22

1R22 Surveillance Testing

CR 123974; Unplanned Unit 1 LCOAR Caused By Unit 2 Sequence Testing; September 21, 2002
CR 137530; 1ES062B Maintenance; December 29, 2002
CR 135504; Inappropriate Action Tracking Item Closure; December 12, 2002
CR 081374; Loop Power Supply Found High on 1AF-014, Auxiliary Flow Loop; November 2, 2001
CR 115630; Unexpected Indication Observed During the Train B SSPS; July 15, 2002

1R23 Temporary Plant Modifications

CR 126138; Violations of CC-AA-112, Temporary Configuration Changes; October 6, 2002
CR 156495; Unauthorized TCC in Unit 1 BTRS Valve Room; April 30, 2003
CR 164460; Corrective Actions from ACE Not Created; June 23, 2003
CR 104152; Adverse Trend in Unauthorized Temp Mods (OP); April 17, 2002

2OS1 Access Control to Radiologically Significant Areas

BRP 5000-7; Unescorted Access to and Conduct in Radiologically Controlled Areas; Revision 11
CR 00145398; Radiation Posting Found on Floor; dated February 20, 2003
CR 00146269; High Radiation Area Discovered in Blue Tool Room; dated February 25, 2003
CR 00149810; Higher than Normal Rad Conditions; dated March 19, 2003
CR 00156350; Electronic Dosimeter Not Properly Logged Out; dated April 28, 2003
CR 00156795; Stop Work Criteria Met for Radiography; dated May 1, 2003
CR 00164523; Radiological Posting Hidden by Stagged Equipment; dated June 23, 2003
CR 00164895; Urine in Seal Water HX Room Drain; dated June 25, 2003
CR 00167515; Entry into Aux Bldg without TLD or Digi; dated July 14, 2003
Focus Area Self-Assessment Report: Access Control to Radiologically Significant Areas; dated November 18 - 20, 2002
Midwest ROG Specific Study Guide; Revision 2; dated April 2003
Nuclear General Employee Training (N-GET) Study Guide; Revision 26; dated April 2003
RP-AA-460; Controls for High and Very High Radiation Areas; Revision 2
Survey 03-0990; AB-401 General Area U-2; dated July 14, 2003
Survey 03-1007; AB-401 General Area U-1; dated July 16, 2003

2OS3 Radiation Monitoring Instrumentation and Protective Equipment

BRP 5510-8; Operation and Use of Air Line Supplied Air Systems; Revision 6
BRP 5510-15; Charging of Air Cylinders for Self-Contained Breathing Apparatus; Revision 7
BRP 5510-16; Operations and Inspection of Self Contained Breathing Apparatus; Revision 6
Byron Site Policy Memo 200.12; Fire Brigade Qualification; dated February 3, 2003
CR 00111424; SCBA in Waste Storage Building; dated June 10, 2002

CR 00117884; Filling of Air Bottles with Air Compressor in Waste Storage; dated July 30, 2002
CR 00120505; Fire Protection SCBA Packs; dated August 24, 2002
CR 00139814; SCBA Not Staged at Access Point for Containment Entry; dated January 16, 2003
CR 00147250; Individual Showed Up for Training Not Prepared for Class; dated March 3, 2003
CR 00162784; CSRT SCBA Packs Found with Expired Seals; dated June 10, 2003
CR 00164015; Radiation Protection Missed Opportunity; dated June 19, 2003
EP-AA-1000; Exelon Nuclear Standardized Radiological Emergency Plan, Section O.4, "Emergency Response Training/ERO Training Program;" Revision 14
Focus Area Self-Assessment Report: Radiation Monitoring Instrumentation; dated December 9 - 12, 2002
Focus Area Self-Assessment Report: Self-Contained Breathing Apparatus and Radiological and Non-Radiological Respiratory Protection Program; dated February 10 - 14, 2003
ISI Viking Digital SCBA (with Digital Indicators) User's Manual; dated 2001
ISI Viking SCBA (Including Pneumatic, Digital, DX and DXL Models) Maintenance and Repair Manual; dated 2003
PosiCheck3 Test Results, Dig. Viking HP (Rack 103) [SCBA Maintenance Record]; dated December 12, 2002
PosiCheck3 Test Results, Dig. Viking HP (Rack 114) [SCBA Maintenance Record]; dated December 12, 2002
PosiCheck3 Test Results, Dig. Viking HP (Rack 150) [SCBA Maintenance Record]; dated December 16, 2002
PosiCheck3 Test Results, Dig. Viking HP (Rack 164) [SCBA Maintenance Record]; dated December 16, 2002
PosiCheck3 Test Results, Dig. Viking HP (Rack 165) [SCBA Maintenance Record]; dated December 17, 2002
Project No. 047-39005-3; Quarterly Service Air and Self Contained Breathing Apparatus - Performed 7/21/03; dated July 22, 2003
RP-AA-440; Respiratory Protection Program; Revision 3
RP-AA-443; Quantitative Respirator Fit Testing; Revision 1
RP-AA-825; Maintenance, Care and Inspection of Respiratory Protective Equipment; Revision 2
SA-AA-114; Confined Space Entry; Revision 3
TE001; Respiratory Qualifications Reports (for Operations, Radiation Protection, Chemistry, Mechanical Maintenance, Electrical Maintenance, and Instrument Maintenance Departments); dated July 21, 2003
Vendor Technician's Maintenance Training and Qualification Documents from ISI, Inc.; dated January 7, 2003 and April 5, 2002

4OA1 Performance Indicator Verification

Database Printout of All RCA ED Exit Transactions with Doses of 100 millirem or greater (July 2002 through June 2003); dated July 24, 2003
LS-AA-2150; Monthly PI Data Elements for Occupational Exposure Control Elements (Revisions 2 and 3); dated July 2002 through June 2003

## LIST OF ACRONYMS USED

| | |
|---|---|
| ALARA | As Low As Reasonable Achievable |
| B1R12 | twelfth Unit 1 refueling outage |
| BAP | Byron Administrative Procedure |
| BEP | Byron Emergency Procedure |
| BOP | Byron Operating Procedure |
| CFR | Code of Federal Regulations |
| CR | Condition Report |
| DRS | Division of Reactor Safety |
| EC | Engineering Change |
| ED | Electronic Dosimetry |
| HDR | High Dose Rate |
| IMC | Inspection Manual Chapter |
| LER | Licensee Event Report |
| LHRA | Locked High Radiation Area |
| MSSV | Main Steam Safety Valve |
| NCV | Non-Cited Violation |
| NGET | Nuclear General Employee Training |
| NRC | United States Nuclear Regulatory Commission |
| NRR | Office of Nuclear Reactor Regulation |
| NSP | Nuclear Station Procedure |
| PI | Performance Indicators |
| PMT | Post Maintenance Testing |
| RCA | Radiologically Controlled Area |
| RCS | Reactor Coolant System |
| RP | Radiation Protection |
| RTD | Resistance Temperature Detector |
| RWP | Radiation Work Permit |
| SCBA | Self-Contained Breathing Apparatus |
| SDP | Significance Determination Process |
| SSC | structures, systems or components |
| SX | Essential Service Water |
| TLD | Thermoluminescent Dosimeter |
| TRM | Technical Requirements Manual |
| TS | Technical Specification |
| TSC | Technical Support Center |
| UFSAR | Updated Final Safety Analysis Report |
| VHRA | Very High Radiation Area |