

August 3, 2006

Mr. Christopher M. Crane  
President and Chief Nuclear Officer  
Exelon Nuclear  
Exelon Generation Company, LLC  
4300 Winfield Road  
Warrenville, IL 60555

SUBJECT: BYRON STATION, UNITS 1 AND 2 NRC INTEGRATED INSPECTION  
REPORT 05000454/2006003; 05000455/2006003; AND 05000454/2006010;  
05000455/2006010

Dear Mr. Crane:

On June 30, 2006, 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 July 10, 2006, with Mr. Dave Hoots and other members of your staff.

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

Based on the results of this inspection, no findings of significance were identified. However, three licensee-identified violations which were determined to be of very low safety significance are listed in this report. The NRC is treating these violations as non-cited violations (NCVs) consistent with Section VI.A.1 of the NRC Enforcement Policy because of the very low safety significance of the violations and because they are entered into your corrective action program.

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, D.C. 20555-0001, with a copy to the Regional Administrator, U.S. Nuclear Regulatory Commission - Region III, 2443 Warrenville Road, Suite 210, Lisle, IL 60532-4352; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001; and the Resident Inspector office at the Byron facility.

In accordance with 10 CFR 2.390 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/**

Richard A. Skokowski, Chief  
Branch 3  
Division of Reactor Projects

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

Enclosure: Inspection Report 05000454/2006003; 05000455/2006003;  
and 05000454/2006010; 05000455/2006010;  
w/Attachment: Supplemental Information

cc w/encl: Site Vice President - Byron Station  
Plant Manager - Byron Station  
Regulatory Assurance Manager - Byron Station  
Chief Operating Officer  
Senior Vice President - Nuclear Services  
Vice President - Mid-West Operations Support  
Vice President - Licensing and Regulatory Affairs  
Director Licensing  
Manager Licensing - Braidwood and Byron  
Senior Counsel, Nuclear  
Document Control Desk - Licensing  
Assistant Attorney General  
Illinois Emergency Management Agency  
State Liaison Officer, State of Illinois  
State Liaison Officer, State of Wisconsin  
Chairman, Illinois Commerce Commission  
B. Quigley, Byron Station

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Director Licensing  
Manager Licensing - Braidwood and Byron  
Senior Counsel, Nuclear  
Document Control Desk - Licensing  
Assistant Attorney General  
Illinois Emergency Management Agency  
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U. S. NUCLEAR REGULATORY COMMISSION

REGION III

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

Report Nos: 05000454/2006003; 05000455/2006003  
05000454/2006010; 05000455/2006010

Licensee: Exelon Generation Company, LLC

Facility: Byron Station, Units 1 and 2

Location: 4450 N. German Church Road  
Byron, IL 61010

Dates: April 01, 2006, through June 30, 2006

Inspectors: B. Bartlett, Senior Resident Inspector  
R. Ng, Resident Inspector  
R. Jickling, RIII Emergency Preparedness Analyst  
R. Winter, RIII Reactor Engineer  
C. Thompson, Resident Inspector, Illinois Emergency  
Management Agency

Approved by: R. Skokowski, Chief  
Reactor Projects Branch 3  
Division of Reactor Projects

## SUMMARY OF FINDINGS

IR 05000454/2006003; 05000455/2006003; 05000454/2006010; 05000455/2006010; on 04/01/2006-06/30/2006; Byron Station, Units 1 and 2; Routine Integrated Inspection Report.

This report covers a 3-month period of baseline resident inspection and announced baseline inspections on emergency preparedness and maintenance rule. These inspections were conducted by regional inspectors and the resident inspectors. No significant findings were identified. 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**

No findings of significance were identified.

### **B. Licensee Identified Violations**

Three violations of very low safety significance, which were identified by the licensee, have been reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. These violations and the licensee's corrective action tracking numbers are listed in Section 4OA7 of this report.

## **REPORT DETAILS**

### **Summary of Plant Status**

Unit 1 operated at or near full power throughout the inspection period with the following exception:

- On May 6, 2006, the unit reduced power to 88 percent to perform main turbine valve testing. Following the test, the unit returned to full power on May 7, 2006.

Unit 2 operated at or near full power throughout the inspection period with the following exceptions:

- On April 23, 2006, the unit reduced power to 94 percent to swap main feedwater pumps for repair. Following the swap, the unit returned to full power on April 24, 2006.
- On April 29, 2006, the unit reduced power to 86 percent to perform main turbine valve testing. Following the test, the unit returned to full power on April 30, 2006.

### **1. REACTOR SAFETY**

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

##### **1R01 Adverse Weather Protection (71111.01)**

###### **a. Inspection Scope**

The inspectors completed two inspection samples. The first sample was associated with the licensee's readiness for high wind/tornado conditions during the summer season. The inspections reviewed the licensee's procedures, operating policy and the limiting conditions of operation for the Ultimate Heat Sink (UHS) related to adverse weather. The inspectors also evaluated the implementation of these procedures and the licensee preparations for the weather conditions. Specifically, the inspectors reviewed the impact on the following two systems.

- Switchyard; and
- Essential service water system.

The second sample was associated with the review of the licensee's preparations for potential high temperature conditions. Specifically, the inspectors reviewed the impact on the following three systems:

- Switchyard;
- Main Steam Pipe Tunnel and Safety Valve Enclosures Ventilation System (VV); and
- Essential service water system (SX).

During these reviews the inspectors performed the following:

- reviewed the Updated Final Safety Analysis Report (UFSAR), Technical Specifications (TS) and other plant documents to identify areas potentially challenged by summer temperatures;
- reviewed applicable licensee procedures and surveillance tests appropriate for monitoring plant conditions during summer weather;
- determined through interviews and record review, that Nuclear Shift Operators were familiar with plant systems potentially affected by high temperatures and that necessary procedural and/or contingency plans were in place; and
- visually inspected the selected plant systems.

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.

1R04 Equipment Alignment (71111.04)

.1 Partial Walkdowns

a. Inspection Scope

The inspectors performed four partial walkdown samples 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 lineups and applicable system drawings to determine 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 determine that there were no obvious deficiencies. The inspectors used the information in the appropriate sections of the UFSAR and TS to determine the functional requirements of the systems.

The inspectors verified the alignment of the following:

- Unit 1 Train B Diesel Generator Fuel Oil;
- Unit 1 Train A Auxiliary Feedwater;
- Unit 1 and Unit 2 Diesel Generator Ventilation; and
- Unit 2 Train A Auxiliary Feedwater.

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.

1R05 Fire Protection (711111.05)

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 Byron Station Pre-Fire Plans applicable for each area inspected were used by the inspectors to determine approximate locations of firefighting equipment.

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

- Fuel Handling Building 401' (Zone 12.1-0);
- Unit 1 Train B Diesel Fuel Oil Storage Tank Room (Zone 10.1-1);
- Unit 1 and Unit 2 Train B Diesel Generator Ventilation (Zones 18.1-1 and 18.1-2);
- Unit 1 and Unit 2 Train A Diesel Generator Ventilation (Zones 18.2-1 and 18.2-2);
- Unit 1 Division 11 Miscellaneous Electrical Equipment and Battery Room (Zone 5.6-1);
- Unit 1 Division 12 Miscellaneous Electrical Equipment and Battery Room (Zone 5.4-1);
- Unit 1 Cable Tunnel & Cable Riser Room (Zone 3.1-1);
- Unit 1 Auxiliary Building Laundry Room (Zone 11.6C-0); and
- Unit 2 Auxiliary Building General Area 346' (Zone 11.2-0).

The inspectors reviewed selected issues documented in CRs, to determine if they had been properly addressed in the licensee's corrective action program. The inspectors also verified that minor issues identified during the inspection were entered into 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.

## 1R06 Flood Protection Measures (71111.06)

### a. Inspection Scope

The inspectors evaluated the licensee's controls for mitigating internal and external flooding by completing one semi-annual sample. The specific areas evaluated for the semi-annual internal flooding sample included the turbine building elevations 380 and 401, circulating water screen house and auxiliary building elevation 401. During the evaluation, the inspectors performed the following:

- Reviewed the licensee's design basis documents including the UFSAR and Safety Evaluation Report, to identify the design basis for flood protection and to identify areas susceptible to flooding;
- Assessed plant configurations that may be impacted by flooding;
- Inspected areas for control of material that could potentially clog floor drains; and
- Inspected water doors and flood seals.

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.

## 1R11 Licensed Operator Requalification (71111.11)

### .1 Resident Inspector Quarterly Review

#### a. Inspection Scope

The inspectors completed one inspection sample by observing and evaluating an operating crew during their response to a simulated dropped control rod, medium sized reactor coolant hot leg break along with the failure of one residual heat removal suction valve to close. 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.

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 determine whether they also noted the issues and discussed

them in the critique at the end of the session. The inspectors verified that minor issues were placed into 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.

1R12 Maintenance Effectiveness (71111.12)

.1 Resident Inspector Quarter Review

a. Inspection Scope

The inspectors completed two inspection samples by evaluating the licensee's implementation of the maintenance rule, 10 CFR 50.65, as it pertained to identified performance problems associated with the following structures, systems, and/or components:

- Unit 1 SX Return Isolation Valves Degraded (1SX011 & 1SX136); and
- SX Cooling Tower Fan Blade Degradation.

The inspectors evaluated the licensee's appropriate handling of structures, systems, and components (SSC) condition problems in terms of appropriate work practices and characterizing reliability issues. Equipment problems were screened for review using a problem oriented approach. Work practices related to the reliability of equipment maintenance were observed during the inspection period. Items chosen were risk significant, and extent of condition was reviewed as applicable. Work practices were reviewed for contribution to potential degraded conditions of the affected SSCs. Related work activities were observed and corrective actions were discussed with licensee personnel. The licensee's handling of the issues being reviewed was evaluated under the requirements of the maintenance rule.

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.

.2 Maintenance Effectiveness Periodic Evaluation (71111.12B)

a. Inspection Scope

The inspectors examined the Maintenance Rule periodic evaluation report completed for the period of July 2003 through December 2004. To evaluate the effectiveness of (a)(1)

and (a)(2) activities, the inspectors examined a sample of (a)(1) Action Plans, Performance Criteria, Functional Failures, and Condition Reports (CRs). These same documents were reviewed to verify that the threshold for identification of problems was at an appropriate level and the associated corrective actions were appropriate. Also, the inspectors reviewed the maintenance rule procedures and processes. The inspectors focused the inspection on the following four systems (samples):

- DC System;
- Essential Service Water;
- Service Air System; and
- Auxiliary Feedwater.

The inspectors verified that the periodic evaluation was completed within the time restraints defined in 10 CFR 50.65 (once per refueling cycle, not to exceed 24 months). The inspectors also ensured that the licensee reviewed its goals, monitored Structures, Systems, and Components (SSCs) performance, reviewed industry operating experience, and made appropriate adjustments to the maintenance rule program as a result of the above activities.

The inspectors verified that:

- the licensee balanced reliability and unavailability during the previous cycle, including a review of high safety significant SSCs;
- (a)(1) goals were met, that corrective action was appropriate to correct the defective condition, including the use of industry operating experience, and that (a)(1) activities and related goals were adjusted as needed; and
- the licensee has established (a)(2) performance criteria, examined any SSCs that failed to meet their performance criteria, and reviewed any SSCs that have suffered repeated maintenance preventable functional failures including a verification that failed SSCs were considered for (a)(1).

In addition, the inspectors reviewed maintenance rule self-assessments and audit reports that addressed the maintenance rule program implementation.

b. Findings

No findings of significance were identified.

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 other related documents to determine 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 completed six inspection samples by reviewing the following activities:

- Unit 1 Train A Auxiliary Feedwater Pump Testing while Bus Tie Breaker 5-6 was Out of Service (OOS);
- Unit 1 Bus Tie Breaker 6-7 Testing while Unit 0 Train A SX Makeup Pump was OOS;
- Unit 1 Train A Centrifugal Charging Pump OOS while Bus 7 was in a Work Window;
- Unit 1 Train A Residual Heat Removal Pump OOS while Unit 0 Train A SX Makeup Pump was OOS for Planned Maintenance;
- Unit 2 Train A Residual Heat Removal Pump OOS during Reactor Containment Fan Cooler Surveillance; and
- Unit 1 Train B Safety Injection Pump OOS with Trip of Unit 0 Train A Station Air Compressor.

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 five inspection samples by reviewing the following evaluations and issues:

- Unit 0 Train A SX Cooling Tower Fan Blade Degradation;
- Unit 1 SX Return Isolation Valves Degraded (1SX011 & 1SX136);
- Unit 0 Train B SX Makeup Pump Fuel Oil Contamination;

- Unit 1 Auxiliary Building Ventilation while the Bilco Hatch was Removed; and
- Unit 1 and Unit 2 Turbine Building Crane with Cracked Welds.

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 determine 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 procedures. The inspectors also discussed the details of the evaluations with the shift managers and appropriate members of the licensee's engineering staff.

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

Introduction: The inspectors identified an unresolved item (URI) concerning the ability of the essential service water system (SX) to perform its safety function after a large leak.

Description: On November 29, 2005, during the execution of a clearance order for planned maintenance, 1SX011, the Unit 1 Train A & B Essential Service Water Cooling Tower (SXCT) basin return header cross-tie isolation valve, and 1SX136, the Unit 1 Train B SXCT return header isolation valve failed to close on demand. The licensee determined that the failure of these isolation valves to close was a maintenance preventable functional failure and had exceeded the maintenance rule performance criteria for the isolation function. A Maintenance Rule (a)(1) action plan was initiated to address this issue.

The inspectors reviewed the operability evaluation for the two degraded valves and identified a deficiency in the evaluation with respect to the ability of the SX system to perform its safety function after a large leak/break. UFSAR Table 9.2.2, Single-failure Analysis of the Essential Service Water System, showed that upon a break of an SX return line, the remaining return line continues to service one loop in each unit. The licensee determined that the loops could not be separated with the above valves not capable of closing. However, the licensee's review determined that the SX return line met the exception criterion described in USFAR Section 3.6. Therefore, the licensee determined that they were not required to postulate that the SX lines would crack or break and they did not have to evaluate the operability of the system in the event of a pipe crack or break.

Specifically, UFSAR Section 3.6, "Protection Against Dynamic Effects Associated with the Postulated Break of Piping," evaluated high and moderate energy line breaks based on Standard Review Plan (SRP) 3.6.1, plant design for protection against postulated piping failures in fluid systems outside containment, and SRP 3.6.2, Determination of Rupture Locations and Dynamic Effects Associated with the Postulated Rupture of Piping. The licensee based their operability determination that piping failure was not needed to be evaluated on an exception criterion allowed in SRP 3.6.2.

The inspectors noted that the licensee was committed to meet General Design Criterion (GDC) 44, Cooling Water System. This GDC required that "suitable redundancy in components and features, and suitable interconnections, leak detection, and isolation capabilities shall be provided to assure that ..... the system safety function can be accomplished, assuming a single failure. UFSAR 3.1.2.4.15, "Evaluation Against Criterion 44 - Cooling Water" stated that "...essential service water systems .... are designed with appropriate redundancy. A single failure can be accommodated without impairing the safety function of the systems."

Based on the apparent contradiction between UFSAR Sections 3.6 and 9.2, the inspectors continue to evaluate the design basis requirements of the SX return line with respect to a pipe break and the adequacy of the associated operability evaluation. Specifically whether the operability evaluation must include all aspects of the current licensing bases requirements such as single failure, flooding, earthquake, and loss of coolant accident. Therefore, this issue is considered an URI pending internal NRC clarification of the design basis with respect to single failure in the SX system and the potential impact on the conclusion of the licensee's operability evaluation. (URI 05000454/2006003-01)

#### 1R17 Permanent Plant Modification (71111.17A)

##### a. Inspection Scope

The inspectors completed one inspection sample by reviewing the following permanent plant modification:

- Setpoint Scaling Change for Unit 0 Train A SX Makeup Pump Low Lube Oil Pressure Trip Time Delay Relay.

The inspectors reviewed the setpoint scaling change after the SX makeup pump low lube oil pressure trip was received prematurely during pump operation. The inspectors verified that the design basis, licensing basis, and performance capability of SX were not degraded by the scaling change. The inspectors considered the design adequacy of the modification by performing a review of the modification's impact on plant electrical requirements, response time, control signals, equipment protection, operation, failure modes, and other related process requirements. Implementation and testing was reviewed to ensure SSC performance criteria were met.

The inspectors utilized the following references during the completion of their review:

- Updated Final Safety Analysis Report; and
- Technical Specifications.

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 determine 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, and other related documents to evaluate this area.

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

- Unit 1 Train A Centrifugal Charging Pump Work Window;
- Unit 1 Train B Residual Heat Removal Miniflow Isolation Valve Time Delay Relay Calibration;
- Unit 2 Train B Residual Heat Removal Pump Work Window;
- Calibration of Unit 1 Steam Generator Narrow Range Level Loop 528 Following the Identification of a Crack in a Transformer on the Card; and
- Unit 0 Train B SX Makeup Pump Diesel Generator.

The inspectors also reviewed selected issues documented in CR's 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.

## 1R22 Surveillance Testing (71111.22)

### a. Inspection Scope

The inspectors witnessed selected surveillance tests and/or reviewed test data to determine that the equipment tested using the surveillance procedures met the TS, the TRM, the UFSAR and licensee procedural requirements. The inspectors also reviewed applicable design documents including plant drawings, to verify that the surveillance tests demonstrated that the equipment was capable of performing its intended safety functions. The activities were selected based on their importance in ensuring mitigating systems capability and barrier integrity.

These activities represented one routine, one containment isolation valve, and one in-service surveillance testing sample. The following surveillance tests were selected:



- Unit 2 Main Steam System Containment Isolation Valve Stroke Time and Position Indication Test;
- Unit 1 Train B Diesel Generator Semi-Annual Surveillance;
- Unit 2 SX Return Isolation Valve Motor Operator Valve Test 2SX136.

Additionally the inspectors used the documents listed in the attachment to this report to determine that the testing met the frequency requirements; that the tests were conducted in accordance with procedures, that the test acceptance criteria were met; and that the results of the tests were properly reviewed and recorded. The inspectors verified that the individuals performing the tests were qualified to perform the test in accordance with the licensee's requirements, and that the test equipment used during the test were calibrated within the specified periodicity. In addition, the inspectors interviewed operations, maintenance, and engineering department personnel regarding the tests and test results.

b. Findings

No findings of significance were identified.

**Cornerstone: Emergency Preparedness**

1EP2 Alert and Notification System (ANS) Testing (71114.02)

a. Inspection Scope

The inspectors reviewed and discussed with corporate Emergency Preparedness (EP) staff records on the operation, maintenance, and testing of the ANS in the Byron Station's Emergency Planning Zone, to verify that the ANS equipment was adequately maintained and tested during 2005 and 2006, in accordance with emergency plan commitments and procedures. The inspectors reviewed a random sample of records of 2005 and 2006 non-scheduled maintenance activities to determine whether equipment examinations and repairs were initiated in a timely manner following identification of apparent malfunctions. The inspectors also reviewed records of ANS tests conducted in January 2005 through March 2006.

The documents reviewed during this inspection are listed in the attachment to this report.

These activities completed one inspection sample.

b. Findings

No findings of significance were identified.

1EP3 Emergency Response Organization (ERO) Augmentation Testing (71114.03)

a. Inspection Scope

The inspectors reviewed and discussed implementing procedures that contained details on the primary and alternate means of initiating an ERO activation to augment the on-shift ERO. The inspectors also discussed administrative provisions for maintaining Byron Station's ERO roster and ERO members' contact information. The inspectors reviewed records of monthly unannounced off-hours augmentation drills, which were conducted between January 2005 and April 2006, to determine the adequacy of the drills' critiques and associated use of the corrective action program. The inspectors reviewed and discussed a program implemented in 2005 that trended each Station ERO member's participation in the off-hours augmentation drills. The inspectors also reviewed training records of a random sample of 16 Byron Station ERO personnel, who were assigned to key and support positions, to verify that they were currently trained for their assigned positions. The inspectors also reviewed the Byron Station's and corporate office's ERO rosters, to verify the numbers of persons assigned to each key and support position.

The documents reviewed during this inspection are listed in the attachment to this report.

These activities completed one inspection sample.

b. Findings

No findings of significance were identified.

1EP5 Correction of Emergency Preparedness Weaknesses and Deficiencies (71114.05)

a. Inspection Scope

The inspectors reviewed Nuclear Oversight (NOS) staff's 2005 audits of the licensee's EP program to verify that these independent assessments met the requirements of 10 CFR 50.54(t). The inspectors reviewed records of EP drills, and exercises conducted during 2005 and 2006, to verify that the licensee fulfilled its drill and exercise commitments. The inspectors also discussed with EP staff to verify that representatives of State and county agencies, and other off-site support organizations, were provided the opportunity to obtain NOS staff's assessment of the adequacy of the licensee's interfaces with these organizations. Additionally, the inspectors reviewed two actual emergency plan activations to determine if the licensee effectively implemented the requirements of the emergency plan for an event that occurred on February 28, 2005, which was inspected and dispositioned in NRC Inspection Report 05000454/2005003, and an Unusual Event declared for a fire on February 24, 2006. Samples of corrective action program records, and completed corrective actions, were reviewed to determine whether NOS-identified concerns, drill and exercise critique concerns, and other EP program concerns, were adequately addressed.

The documents reviewed during this inspection are listed in the attachment to this report.

These activities completed one inspection sample.

b. Findings

No findings of significance were identified.

**4. OTHER ACTIVITIES**

4OA1 Performance Indicator Verification (71151)

**Cornerstone: Initiating Events, Barrier Integrity, Emergency Preparedness**

.1 Initiating Events and Barrier Integrity Performance Indicators

a. Inspection Scope

The inspectors sampled the licensee's submitted materials for performance indicators (PIs) and periods listed below. 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 for Unit 1 and Unit 2, for a total of eight samples, were reviewed:

- Unit 1 Unplanned Scrams per 7000 Critical Hours (April 2004 to December 2005);
- Unit 2 Unplanned Scrams per 7000 Critical Hours (April 2004 to December 2005);
- Unit 1 Scrams with Loss of Normal Heat Removal (April 2004 to December 2005);
- Unit 2 Scrams with Loss of Normal Heat Removal (April 2004 to December 2005);
- Unit 1 Unplanned Transients per 7000 Critical Hours (April 2004 to December 2005);
- Unit 2 Unplanned Transients per 7000 Critical Hours (April 2004 to December 2005);
- Unit 1 Reactor Coolant System Specific Activity (April 2004 to December 2005); and
- Unit 2 Reactor Coolant System Specific Activity (April 2004 to December 2005).

The inspectors reviewed selected applicable condition reports and data from logs, licensee event reports, and work orders from April 2004 through December 2005 for each PI area specified above. The inspectors independently reperformed calculations where applicable. The inspectors compared that information with the performance indicator definitions in the guideline to ensure that the licensee reported the data accurately.

For the reactor coolant system specific activity PI, the inspectors reviewed the licensee's Chemistry Department records and selected isotopic analyses to verify that the greatest Dose Equivalent Iodine value obtained during those months corresponded with the value reported to the NRC. The inspectors also reviewed selected dose equivalent iodine calculations to verify that appropriate conversion factors were used in the assessment as required by TSs.

The documents reviewed during this inspection are listed in the Attachment to this report.

b. Findings

No findings of significance were identified.

.2 Emergency Preparedness Performance Indicators

a. Inspection Scope

The inspectors reviewed the licensee's records associated with the three EP performance indicators (PIs) listed below. The inspectors verified that the licensee accurately reported these indicators, in accordance with relevant procedures and Nuclear Energy Institute guidance endorsed by NRC. Specifically, the inspectors reviewed licensee records associated with PI data reported to the NRC for the period April 2005 through December 2005. Reviewed records included: procedural guidance on assessing opportunities for the three PIs; assessments of PI opportunities during pre-designated Control Room Simulator training sessions, the 2005 biennial exercise, and integrated emergency response facility drills; revisions of the roster of personnel assigned to key ERO positions; and results of ANS operability tests. The following PIs were reviewed:

- ANS;
- ERO Drill Participation; and
- Drill and Exercise Performance.

These activities completed three inspection samples.

The documents reviewed during this inspection are listed in the attachment to this report.

b. Findings

No findings of significance were identified.

## 4OA2 Identification and Resolution of Problems (71152)

### .1 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 determine 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.

### .2 Selected Issue Follow-up Review - Incorrect Main Control Board (MCB) Manipulated During Training Activity

Introduction: On April 24, 2006, an Initial License Training (ILT) student under the oversight of a Nuclear Station Operator (NSO) manipulated the wrong valve during a boration of the reactor coolant system. During this boration evolution, the ILT student was supposed to open the primary water to Unit 2 boric acid blender inlet flow control valve to flush the boration line. Instead, the boric acid to Unit 2 boric acid Blender inlet flow control valve was opened. The NSO, a second NSO, who was assigned as a peer checker, and a Senior Reactor Operator (SRO), who was designated by procedure to observe any reactivity maneuver, did not recognize that the wrong valve was being manipulated by the ILT trainee. The incorrect manipulation was immediately discovered when the expected primary water flow was not observed at the primary water totalizer by the second NSO. The boric acid flow control valve was closed, and the issue was entered into the licensee's corrective action program as IR 482467.

Since the boric acid transfer pump was not running at the time, no boric acid was injected into the reactor coolant system as a result of the incorrect valve manipulation. However, it indicated a degradation of one or more barriers to proper reactivity management. In addition, this event revealed the human performance deficiencies of three licensed operators and one ILT trainee. The inspectors selected this issue as one annual sample of the licensee's problem identification and resolution program.

Documents reviewed as part of this inspection are listed in the Attachment to this report.

a. Prioritization and Evaluation of Issues

(1) Inspection Scope

The inspectors reviewed the apparent cause evaluation (ACE) associated with IR 482467 and discussed the evaluation with members of the licensee's investigation team. The inspector compared the evaluation method used to guidance in the licensee's procedures, and discussed the technical aspects of the issue with members of the licensee's operation staff. The inspectors assessed the licensee's evaluation and disposition of performance issues and prioritization of issues. The inspectors also conducted an independent search on the licensee's corrective action program database to verify if there were similar events in the past.

(2) Issues

In general the inspectors found that the licensee prioritized and evaluated issues appropriately. The licensee used a TapRoot Root Cause Tree to determine if the root cause for each causal factor and the root causes identified were being addressed. The licensee concluded that the process requirements of this procedure were adequately followed but the issues occurred because of breakdowns in human performance tool usage. Since this personnel performance error did not result in an actual reactivity addition to the reactor, this issue is considered to be minor. However, personnel performance in the human performance area continues to show weakness and is being treated as a substantive cross-cutting issue under NRC's Inspection Manual Chapter 0305. A trend review on this subject is described in Section 4OA2.2 of this report.

The licensee also evaluated the extend of condition for the causes identified and determined that this issue was limited to the individuals involved as evident by the circumstances. Based on the search of the corrective action program database, the inspectors determined that the licensee had performed an adequate review of previous events in the ACE.

No significant issues were identified in this area.

b. Effectiveness of Corrective Actions

(1) Inspection Scope

The inspectors reviewed the correction actions prescribed for each apparent cause to determine if the issues were being resolved promptly and appropriately.

(2) Issues

As part of the corrective actions for this event, the licensee reinforced the use of human performance tools and quality peer-checks to all operating personnel. Training would also be reinforced using the lessons learned from this event. The inspectors determined

that the corrective actions addressed the causes that were identified. Although some of the corrective actions were not completed, the inspectors determined that they were appropriate and were being implemented in a timely manner.

No significant issues were identified in this area.

.3 Semi-Annual Trending Review (71152)

a. Inspection Scope

The inspectors completed a semi-annual review for potential or identified trends. The purpose of this review was to determine if any potential or identified trends might indicate a more significant safety issue.

The inspectors reviewed issues that were documented in the following licensee programs, analyses, assessments or lists:

- Systems Classified as (a)(1) under the Maintenance Rule;
- Trend Analysis of Operations Communications Issues;
- Byron Station Quarterly System Health Indication Program Report - First Quarter 2006;
- Perform Common Cause Analysis on Modifications Process Quarterly Trend Data;
- Quarterly CAP Trend Analysis for Engineering, October 1, 2005, through March 30, 2006;
- Quarterly CAP Trend Analysis for Operations, October 1, 2005, through March 30, 2006;
- Common Cause Analysis for Contamination Events During the First and Second Quarter 2006;
- Common Cause Analysis of 2006 QHPI's;
- CCA for Potential Adverse Trend in Procedure Adherence, IR 428949, February 9, 2006; and
- Operations Action Plan to Improve 2006 Human Performance.

The inspectors reviewed the above information for the time period designated or for the past 2 years and discussed these programs and reports with the applicable members of the licensee's staff. The inspectors also verified that any trends identified by these programs and reports were appropriately entered and classified in the licensee's corrective action program.

The inspectors also considered aspects of the day-to-day inspection activities and categorized CRs that the inspectors accumulated during their daily review of issues entered into the licensee's corrective action program to determine if trends existed that were overlooked by the licensee. Based on this consideration, the inspectors focused on issues associated with age-related material degradation of plant equipment.

b. Issues

No findings of significance were identified. The inspectors noted a number of age-related material degradation items around the plant. Some of these items had been noted by the licensee and others had not. For example, a number of containment penetration feeder breakers had failed during testing. The licensee had appropriately documented the failures and this issue was added to the Maintenance Rule (a)(1) items. Another example was the degradation of the Essential Service Water Cooling Tower Fan Blades. This too had been observed by the licensee, but the licensee agreed that their response could have been more timely.

During this and previous inspection periods, the NRC inspectors identified a number of minor issues. Examples included, a support for the Unit 2 Train B D/G exhaust muffler sheared in two, ventilation barriers on the roof of the auxiliary building rusted and missing, and a large clamp holding a non-safety related portion of the D/G exhaust rusted through.

None of the issues discussed above resulted in violations of NRC requirements. Some components above required complex operability assessments by the licensee, but none of the TS-required equipment was determined to be inoperable. Licensee personnel, including system engineers, component engineers, operators and other plant personnel routinely monitored systems and components for unusual, abnormal, or previously unobserved degradation.

4OA3 Event Follow-Up (71153)

.1 (Closed) LER 454-2006-002-00: All Refueling Water Storage Tank Level Instrumentation Channels Made Inoperable During a Single Channel Calibration Activity Due to a Design Flaw

On March 15, 2006, the licensee identified that during calibration of a single refueling water storage tank (RWST) level channel, the other three channels were rendered inoperable as there is no isolation valve among the reference legs of all four level channels. The licensee determined that a 1989 modification to the RWST level instruments common reference leg was flawed in that it did not provide for a single channel calibration activity without impacting the other three channels. This licensee-identified finding involved a violation of 10 CFR 50, Appendix B, Criterion III. The enforcement aspects of the violation are discussed in Section 4OA7. This LER is closed.

4OA4 Review of Third Party Reports

During this assessment period, the inspectors reviewed a periodic assessment of the licensee performed by INPO and WANO. The report was dated December 2005. The inspectors' review determined that the report findings were consistent with NRC observations and conclusions and that, as appropriate, items were added to the licensee's corrective action program.



#### 4OA6 Meetings

- .1 The inspectors presented the inspection results to Mr. D. Hoots and other members of licensee management on July 10, 2006. 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:

- Emergency Preparedness inspection with Ms. M. Snow on April 21, 2006; and
- Maintenance Effectiveness Periodic Evaluation with Mr. D. Hoots on June 16, 2006.

#### 4OA7 Licensee Identified Violations

The following violations of very low significance were identified by the licensee and were violations of NRC requirements which met the criteria of Section VI of the NRC Enforcement Manual, NUREG-1600, for being dispositioned as an NCV.

##### **Cornerstone: Mitigating Systems**

- 10 CFR 50, Appendix B, Criterion III, Design Control, requires, in part, that measures shall be established to assure that applicable regulatory requirements and the design basis are correctly translated into specifications, drawings, procedures, and instructions. Contrary to this, a 1989 modification to the RWST level instruments common reference leg was flawed in that it did not provide for a single channel calibration activity without impacting the other three channels. Specifically, during calibration of a single channel, the other three channels were impacted as there was no isolation valve among the reference legs of all four level channels. Hence, the design requirement, as described in General Design Criteria 21 and 22, for channel separation during testing was not maintained.

This violation was of very low safety significance because the duration of the instrument calibration was very short and infrequent and the calibration did not affect the availability of borated water to cool the core when required. This issue was entered into the licensee's corrective action program as CR 466676 and CR 477497.

- Byron Station's Operating License Condition 2.C.(6) states, in part, that "The licensee shall implement and maintain in effect all provisions of the approved fire protection program as described in the SER." Section 9.5.1 of the UFSAR states that "The design bases, system descriptions, safety evaluation, inspection and testing requirements, personnel qualification, and training are described in Reference 1 [the Fire Protection Report]." Section 2.3.12.1 of the Fire Protection Report states, in part, that "Fire dampers are provided in the fire wall separating the fuel handling building and the auxiliary building." Contrary to the above, the licensee failed to have installed dampers in the firewall separating the spent fuel

pool heat exchanger rooms of the fuel handling building and the Unit 1 and Unit 2 containment pipe penetration areas of the auxiliary building since original construction.

This violation is of very low safety significance because the steel ventilation duct provided a minimum of 60 minutes fire endurance protection, and the location of combustibles were positioned such that the unprotected duct penetration would not be subjected to direct flame impingement. This issue was entered into the corrective action program as CR 478456.

#### **Cornerstone: Emergency Preparedness**

- 10 CFR 50.54(q) requires, in part, that a licensee shall follow and maintain in effect emergency plans which meet the standards in Section 50.47(b) and requirements in Appendix E of this part. The licensee may make changes to these plans without Commission approval only if the changes do not decrease the effectiveness of the plans. Contrary to the above, emergency action level (EAL) HU-5, Natural or destructive phenomenon inside the protected area or switchyard, was revised in a non-conservative manner. The non-conservative Unusual Event revision, which was implemented on January 17, 2006, erroneously referenced a seismic acceleration value for the Alert, and was identified by the licensee to be the result of inadequate technical reviews. The licensee identified and restored EAL HU-5 to the correct wording in a revision implemented on March 17, 2006.

The licensee's implementation of changes to EAL HU-5 on January 17, 2006, decreased the effectiveness of the emergency plan without prior NRC approval, and was consequently a violation of 10 CFR 50.54(q). The finding is not suitable for SDP evaluation, but has been reviewed by NRC management and is determined to be a finding of very low safety significance. Because the violation has been entered into the licensee's corrective action program and it was of very low safety significance, it is being treated as a non-cited Severity Level IV violation.

ATTACHMENT: SUPPLEMENTAL INFORMATION

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### Licensee

D. Hoots, Site Vice President  
M. Snow, Plant Manager  
B. Adam, Work Control Director  
D. Drawbaugh, Emergency Preparedness Manager  
A. Giancattarino, Engineering Director  
W. Grundmann, Regulatory Assurance Manager  
S. Kerr, Chemistry Manager  
W. Kouba, Nuclear Oversight Manager  
M. Prospero, Operations Manager  
S. Stimac, Training Director

#### Nuclear Regulatory Commission

R. Skokowski, Chief, Division of Reactor Projects

### **LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED**

#### Opened

05000454/2006003-01	URI	Unit 1 Essential Service Water Return Isolation Valves Degraded (1SX011 & 1SX136)
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#### Opened and Closed

05000454/2006-002-00	LER	All Refueling Water Storage Tank Level Instrumentation Channels Made Inoperable During a Single Channel Calibration Activity Due to a Design Flaw.
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#### Closed

None

#### Discussed

None

## 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.

### 1R01 Adverse Weather Protection

Work Order 817475, High Temperature Protection, May 09, 2006;  
AR 486628, 0B SXCT Basin Inspection Results - General Grounds Condition, May 04, 2006;  
BAP 320-1, Shift Staffing, Revision 17;  
CR 429759, 1C MSIV Vent Fan Differential Pressure Swinging, December 02, 2005;  
CR 433684, Vibration Data Indicates Minor Bearing Degradation - 2VV01CA, December 14, 2006;  
CR 499247, Potential Missile Hazards Identified by NRC, June 12, 2006;  
CR 499626, Housekeeping Items Identified in NRC/IDNS Walkdown, June 13, 2006;  
CR 499638, 1A Leak From Positioner, June 13, 2006;  
CR 477499, Summer Readiness Assessment Deficiencies, April 11, 2006;  
Adverse Condition Monitoring and Contingency Plan, 1FW009A Pneumatic Pump Excessive Cycling, June 01, 2006;  
MA-AA-716-026, Station Housekeeping/Material Condition Program, Revision 3;  
Nuclear Station Switchyard Readiness Certification for Summer 2006;  
WC-AA-107, Seasonal Readiness, Revision 2;  
WR 195429, 1C MSIV Vent Fan Differential Pressure, December 29, 2005;  
IR 493779, Switchyard Housekeeping Issues, Loose Material, May 25, 2006;  
IR 497368, High Level in MSIV Reservoir Unit 2;  
IR 498880, Use of NSOs for Safe Shutdown Manning, June 11, 2006;  
IR 494313, Hydraulic Pump Running One Second Every Six Second, May 27, 2006;  
Letter from D. Hoots to M. Pacilio, Statement of Byron Station Summer Readiness, May 01, 2005;  
System Engineering System Readiness Review for Switchyard (SY), December 21, 2005;  
System Engineering System Readiness Review for Miscellaneous Auxiliary (VV), December 18, 2005;  
System Engineering System Readiness Review for Essential Service Water System (SX), December 15, 2005.

### 1R04 Equipment Alignment

CR 442048, NRC Identified Material Condition Issues in the Auxiliary Building, January 13, 2006;  
CR 485867, Issues Identified By NRC, May 02, 2006;  
CR 485870, Roof Drain Plugged, May 02, 2006 (NRC Identified);  
CR 486323, NRC Identified Conditions on Auxiliary Building Roof, May 03, 2006;  
CR 486810, Security - Roof Barriers Deteriorating, May 04, 2006 (NRC Identified);  
CR 487522, Hole in Area of Jamb of 0DSD532, May 02, 2006 (NRC Identified);

CR 487527, 1A EDG Exhaust Stack Rain Cap Clamp Cracked, May 03, 2006 (NRC Identified);  
 CR 487530, 1B EDG Exhaust Stack Rain Cap Clamp Broken, May 03, 2006 (NRC Identified);  
 CR 487532, 2A DG Exhaust Stack Rain Cap is Corroded/Degraded, May 03, 2006  
 (NRC Identified);  
 CR 487533, NRC Identified DG Exhaust Room Ventilation Screens Missing Fasteners,  
 May 03, 2006;  
 CR 488437, NRC Identified Door 0DSD348 Found Closed with 2" Gap at Bottom,  
 May 09, 2006;  
 CR 488854, NRC Identified Security Barriers Deteriorating, May 10, 2006;  
 CR 488868, NRC Identified Security Barrier Loose, May 10, 2006;  
 CR 488875, NRC Identified Security Barrier Loose, May 10, 2006;  
 CR 498170, In Response to NRC Observation of a Broken Bolt Found...Bolt Material For  
 Exhaust Silencer Does Not Match Drawing, June 08, 2006;  
 CR 498195, In Response To an NRC Identified Issue on DG Support Found Error in Calculation  
 for Exhaust Silencer Foundation, June 08, 2006;  
 CR 500447, NRC Identified 2DO024B Locking Device Loose; Diesel Fuel Crosstie Between 2A  
 and 2B DG Fuel Oil Day Tank, June 15, 2006;  
 CR 500456, NRC Identified Lock Device Loose on 1DO129; Need Better Locking Device,  
 June 15, 2006;  
 CR 503340, NRC Identified Small DG Fuel Oil Leak, June 22, 2006;  
 CR 503344, NRC Identified Small DG Fuel Oil Leak on Differential Pressure Switch,  
 June 22, 2006;  
 Drawing 98003181-1, Revision A, Rupture Disc 24 inch (F) Type "DV";  
 Drawing M-556 Sheet 7, Revision M, Auxiliary Building Elevation 401' 0" and 477' 0" Diesel Oil  
 System;  
 Drawing 77-37-0053-80, Revision B, Assembly 24" (F) Slip on Flange with Schedule 40 Pipe;  
 BOP AF-M2A, Auxiliary Feedwater System Train "A" Valve Lineup, Revision 3;  
 BOP AF-E1A, Unit 1 Auxiliary Feedwater Train "A" Electrical Lineup, Revision 1;  
 BOP AF-M1A, Auxiliary Feedwater System Train "A" Valve Lineup, Revision 3;  
 BOP AF-E2A, Unit 2 Auxiliary Feedwater System Train "A" Electrical Lineup, Revision 1.

#### 1R05 Fire Protection

OP-AA-201-006, Control of Temporary Heat Sources, Revision 2;  
 OP-AA-201-009, Control of Transient Combustible Material, Revision 4;  
 OP-MW-201-007, Fire Protection System Impairment Control, Revision 3;  
 Division 12 Miscellaneous Electrical Equipment and Battery Room (Zone 5.4-1);  
 Fuel Handling Building Elevation 401' 0" (Zone 12.1-0);  
 GL 86-10, Evaluation BYR-34, Revision 0, Fire Protection Evaluation for Fire Zone 11.2-0.  
 March 15, 2001;  
 CR 478456, Fire Dampers Not Installed in Fire Rated Barriers, April 13, 2006;  
 CR 490257, Fire Barrier Door 0DS0383 Latch Taped to Prevent Closure, May 15, 2005;  
 CR 500024, Door 0DSD237 Found Not Latching, June 14, 2006 (NRC Identified);  
 Fire Detection Miscellaneous Plans, 6E-0-3911, Revision F;  
 Cable Pans, Auxiliary Building Plan Elevation 415'-0", 6E-1-3041, Revision M;  
 BAP 1100-3A3, Pre-Evaluated Plant Barrier Matrix, Revision 18;  
 Byron Station Pre-Fire Plans, Revision 3, Auxiliary Building-346' Elevation - General Area-  
 North/West/Northwest/ (Zone 11.2-0);

Byron Station Pre-Fire Plans, Revision 4, Auxiliary Building - 426' Elevation - Laundry Room (Zone 11.6c-0);  
Auxiliary Building Roof Framing Plan, S-1325;  
Auxiliary Building Main Floor Plan Elevation 451' 0", Structural Steel FireProofing Plan - A-820, Revision L;  
Byron Station Pre-Fire Plans, Revision 4, Auxiliary Building 451' Elevation-Division 21; Misc. Electrical Equipment and Battery Room (Zone 5.6-1);  
Unit 1 Cable Tunnel;  
TRM Change Request Number 04-005, May 14, 2004.

#### 1R06 Flood Protection

BAR 1-17 B13, Circulating Water Pressure Low, Revision 1;  
BAR 1-17 E11, Circulating Water Pump Cooling Water Pressure Low, Revision 3  
BOP CW-25, Natural Draft Cooling Tower Operation, Revision 12;  
BOP CW-1, Circulating Water System Startup, Revision 23;  
Drawing M-44, Sheet 4, Circulating Water System, Unit 1;  
Drawing M-144, Sheet 3, Circulating Water System, Unit 2;  
UFSAR Section 9.3.3.2;  
CR 357796, Plugged Floor Drain, July 28, 2005;  
CR 392208, Failed PMT on 369' Turbine Building Wall Repair, October 30, 2005;  
CR 425502, Floor Drain Plugged, November 18, 2005;  
CR 436111, Cracks Identified In Turbine Building Masonry Wall, December 21, 2005;  
CR 442442, Watertight Door Degraded, January 16, 2006;  
CR 481351, Auxiliary Building (Area 5) Floor Drains Plugged;  
CR 506094, Crack in Wall, July 3, 2006.

#### 1R11 Licensed Operator Requalification Program (Quarterly)

Byron Station Licensed Operator Requalification Simulator Scenario Guide, Cycle 06-4, Out of the Box Evaluation, #06-4-1, Revision 0.

#### 1R12 Maintenance Effectiveness

Maintenance Rule Periodic Assessment #5, January 2002-June 2003;  
Maintenance Rule Periodic Assessment #6, July 2003-December 2004;  
ER-AA-310-1004, Functional Failure Cause Determination Evaluation for Maintenance Rule Function (SX5);  
ER-AA-310-1005; (a)(1) Action Plan Development and Action Plan (Monitoring) Goal setting for Maintenance Rule Function (SX5), February 23, 2006, Revision 3;  
ER-AA-310-1006, Maintenance Rule - Expert Panel Roles and Responsibilities, Revision 2;  
MA-AA-716-210; Performance Centered Maintenance (PCM) Process, Revision 4;  
Maintenance Rule (a)(1) Disposition Checklist and Documentation Summary for FW1, Revision 0 and 1;  
Maintenance Rule (a)(1) Disposition Checklist and Documentation Summary for SA1, Revision 0;



Maintenance Rule (a)(1) Disposition Checklist and Documentation Summary for SX5, Revision 0;  
Expert Panel Meeting Minutes, July 10, 2003;  
Expert Panel Meeting Minutes, September 14, 2004;  
Expert Panel Meeting Minutes, November 22, 2004;  
Maintenance Rule Check-In Self-Assessment Report, April 21, 2006;  
BB PRA-017.03B, Maintenance Rule Performance Criteria, Revision 2, Addendum 1;  
CR 183222, +100V Ground on DC Bus 112; October 28, 2003;  
CR 195433, Declared 2B AF Pump Inoperable Due to No Oil in Pump, January 15, 2004;  
CR 428265, 1SX136 Did Not Stroke Full Open when Requested, November 29, 2005.

#### 1R13 Maintenance Risk Assessments and Emergent Work Control

CR 483570, NRC Identified Pre-Job Briefing Did Not Include Discussions for Maintaining Availability, April 26, 2006;  
Unit 1/2 Standing Order, Contingency Plans to Maintain Equipment Available for Online Risk, Log No. 06-019, April 27, 2006;  
Protected Equipment Log, April 24, 2006;  
Protected Equipment Log for Bus 7 Outage, May 15, 2006;  
Protected Equipment Log for 1B CV Pump Outage, May 15, 2006;  
Unit 2 Risk Configurations, Week of May 08, 2006, Revision 1;  
Unit 2 Risk Configurations, Week of June 12, 2006, Revision 1;  
1BOSR 3.2.3-1, Unit 1 Undervoltage Simulated Start of 1A Auxiliary Feedwater Pump Monthly Surveillance, Revision 2;  
Byron's Archival Operations Narrative Logs, June 11-June 16, 2006;  
Schematic Diagram, 6E-1-4030AF01, Auxiliary Feedwater Pump 1A, 1AF01PA, Revision AB.

#### 1R15 Operability Evaluations

Operability Evaluation 05-006, Degraded SX Valves 1SX011 and 1SX136, Revision 2, February 14, 2006;  
IR 481729, 2SX010 As-Found Torque Greater Than Acceptance Criteria, April 20, 2006;  
CR 428230, 1SX011 Valve Failed to Electrically Stroke Closed, November 28, 2005;  
CR 428265, 1SX136 Did Not Stroke Full Open When Requested, November 29, 2006;  
CR 430294, 1(2)SX010, 011 and 136 Degradation Identified But Not Fixed, December 04, 2005;  
CR 431267, Availability of SX Isolation Valves-IR 430294 SOC Review, December 07, 2005;  
CR 438307, NRC Concern on Design Basis Requirements (NRC Identified), January 3, 2006;  
CR 490729, Fuel Oil Sample, 0BOSR 7.9.9-1, SX, Appeared Cloudy, May 16, 2006;  
Lab Report: Diesel Fuel, Analyst Lab Number: EPN 0DO08TB, Analysts Lab. Number 9627, May 16, 2006;  
CR 502484, NRC Identified Question Regarding ESW Cooling Tower Annual Fan Surveillance; Diagram of Diesel Fuel Oil, M-50, Revision AX;  
Diesel Fuel Oil Storage Tanks, NL-10755-6;  
IST-BYR-BDOC-V-09, Byron Inservice Testing Bases Document, Valve EPN 1SX010, February 19, 2001;  
IST-BYR-BDOC-V-09, Byron Inservice Testing Bases Document, Valve EPN 1SX011, February 19, 2001;

IST-BYR-BDOC-V-09, Byron Inservice Testing Bases Document, Valve EPN 1SX0136, February 19, 2001;  
WO 99269622, BYR-1SX011, MOV Diagnostic Test, May 17, 2003;  
WO 99205685, BYR-1SX136, MOV Diagnostic Test, January 16, 2002.

#### 1R17 Permanent Plant Modifications (Annual)

Engineering Change 360138, Revise 0A SX Makeup Pump Low Lube Oil Pressure Pump Trip Time Delay Relay Setting (0SX02JA-K11), Revision 0;  
SSCR No. 00-024, Setpoint/Scaling Change Request, December 04, 2000;  
WO 904345, Revise Time Delay Relay Setting (0SX02JA-K11) per Engineering Change 360138, March 24, 2006

#### 1R19 Post Maintenance Testing

CR 485546, 1FW-0528 Loop NLP Card Found with Cracked Transformer, May 2, 2006;  
CR 486254, 0B SX Makeup Pump Gearbox Lube Oil Pressure Low During Post Maintenance Run, May 03, 2006;  
CR 486337, Need to Check Pressure Regulator Locking Nut, May 03, 2006;  
CR 486343, 0B SX Makeup Pump Gearbox Pressure Regulating Valve Degraded, May 03, 2006;  
WO 602030-03, Operations PMT Check for Leaks Non-ISI While Fan is Running; May 25, 2006;  
WO 735695-02, 1RH611 TDR Functional Test, July 08, 2006;  
WO 887865-02, Operations PMT - No Oil Leaks at Outboard Pump RTDS & Gear Box Oil PP, May 17, 2006;  
WO 828045-03, Operations PMT - Perform Functional Check of Fans with EMD Support, May 17, 2006.

#### 1R22 Surveillance Testing

Inservice Testing Bases Document, IST-BYR-BDOC-V-14 for 2MS018A, Steam Generator Atmospheric Relief Valve, December 21, 1999;  
Inservice Testing Bases Document, IST-BYR-BDOC-V-14 for 1MS101A, Main Steam Isolation Valve Bypass Valve, December 01, 2000;  
IST Valve Reference Value/Acceptance Criteria Evaluation, ISTVRV- 94-019, Steam Generator PORVs & Main Steam Isolation Bypass Valves, January 30, 1995;  
IST Valve Evaluation Form, Report No. 00-017, Valve EPN - 2MS101D, September 29, 2000;  
Work Order 885988-01, 2BOSR 6.3.5-19, STT 2MS101A-D, 018A-D & FST 2MS019A-D, April 21, 2006;  
Work Order 750722-01, 2BOSR 0.5-2.MS.3, PIT for 2MS101A-D, 2MS018A-D, April 21, 2006;  
Work Order 761725, MOV Diagnostic Test, Valve No. 2SX136, May 09, 2006.

#### 1EP2 Alert and Notification System (ANS) Testing

Byron Siren Daily Operability Reports, January through March 2006;  
Byron Monthly Siren Availability Reports, January 2005 through March 2006;  
IR 00366771, Exelon Semi-Annual Review of First Half 2005 Siren Data, August 25, 2005;



IR 00451875, Exelon Semi-Annual Review of Second Half 2005 Siren Data, February 9, 2006;  
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### 1EP5 Correction of Emergency Preparedness Weaknesses and Deficiencies

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AR 0353217, Byron Pre-Exercise Failed Demonstration Criteria OSC Performance; July 14, 2005;  
AR 0390523, Fire Reported in Turbine Building Near Security Diesel Room, October 26, 2005;  
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AR 0439327, NRC Will Debrief Potential NCV for 2004 EAL Revision, January 6, 2006;  
AR 0458250, Alert Declaration Challenge Following UE Termination, February 24, 2006;  
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AR 0467260, EAL HU5 Threshold Found to be Non-Conservative, March 16, 2006;

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AR 0477980; Potentially Non-Conservative EAL for Loss of Heat Removal; April 12, 2006;  
AR 0478833; Byron NOS Identified Potential EAL Issue that Impacts Braidwood; April 14, 2006;  
IR 0306538; EAL not Declared in a Timely Manner; February 28, 2005;  
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#### 4OA1 Performance Indicator Verification

Byron Unit 1 PI: IE01, Unplanned Scrams per 7,000 Critical Hours;  
Byron Unit 1 PI: IE02, Scrams with Loss of Normal Heat Removal;  
Byron Unit 1 PI: IE03, Unplanned Power Changes per 7,000 Critical Hours;  
Byron Unit 2 PI: IE01, Unplanned Scrams per 7,000 Critical Hours;  
Byron Unit 2 PI: IE02, Scrams with Loss of Normal Heat Removal;  
Byron Unit 2 PI: IE03, Unplanned Power changes per 7,000 Critical Hours;  
Monthly Data elements for NRC/WANO Unit/Reactor shutdown Occurrences, April 2004 to December 2005;  
Monthly Data elements for NRC Unplanned power Changes per 7000 Critical Hours, April 2004 to December 2005;  
NEI 99-02, Regulatory Assessment Performance Indicator Guideline, Revision 2;  
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CR 354413, CDE Data Not Correct - Critical Hours, Net Generation; July 19, 2005;  
1BCSR 4.16.2-1, Unit 1 Reactor Coolant Dose Equivalent Iodine-131, Bi-Weekly or Due to Changing Reactor Power, Revision 8;  
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LS-AA-2120, Monthly Data Elements for NRC Drill/Exercise Performance, April through December 2005;  
Byron Daily Siren Operability Reports, January 1 through December 31, 2005;  
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#### 4OA2 Identification and Resolution of Problems

Apparent Cause Report, Incorrect Main Control Board (MCB) Manipulated During Training Activity, April 24, 2006;  
CR 324688, Attention to Detail Issues with CAP Quality Records, April 14, 2005;  
CR 342636, Action Tracking 201085-30 did Not Fully Comply With Closure Criteria, June 9, 2005;  
CR 349478, Operations First Quarter CAP Trending - Outage Related Events, June 29, 2005;  
CR 349742, Rounds Readings for DC 212 are Below Administrative Limits, July 2, 2005;  
CR 350287, Circuit Board Showing Signs of Heat Degradation, July 1, 2005;  
CR 357356, Work Scope Inadvertently cancelled, July 27, 2005;

CR 375009, Fuel Oil Storage Tanks cleaning Process, September 19, 2005;  
CR 384204, No Actions for Containment Hatch Overpressurization, October 10, 2005;  
CR 386285, Five IRs Coded As Class C with No CCAs Assigned from Them, October 14, 2005;  
CR 396279, Poor As Found Condition of the Unit 1 Train B auxiliary feedwater pump jacket water makeup Switch, November 8, 2005;  
CR 431705, Gaps Noted in Maintenance Self-Assessments Activities, December 7, 2005;  
CR 436037, Unit 1 Train A Diesel Generator Large Swings in VARs During the Monthly Surveillance, December 21, 2005;  
CR 439839, Zero Bravo SX Makeup Pump Fuel Oil in upper Site Glass Empty, January 7, 2006;  
CR 441548, Feeder Breakers for Pressurizer Heaters Failed their Surveillance, January 12, 2006;  
CR 453593, Unplanned LOCAR Entry on Unit 2 Train A Containment Spray Pump, February 14, 2006;  
CR 482467, Control Switch Misposition, April 24, 2006;  
CR 496175, Zero Bravo SX Makeup Pump ASME Test Needs to be Re-Performed, June 2, 2006;  
CR 506766, CAP Performance Indicator in Variance - Median Age of Corrective Actions, July 6, 2006;  
Unit 0 Standing Order, Place Keeping and Communications of issues, Log Number 06-018, April 25, 2006;  
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#### 4OA3 Event Followup

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IR 477497, RWST Level Operability Impacted by Transmitter Calibration, April 11, 2006;  
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## LIST OF ACRONYMS USED

ADAMS	Agencywide Documents Access and Management System
AFW	Auxiliary Feedwater
ANS	Alert and Notification System
ASME	American Society of Mechanical Engineers
CFR	Code of Federal Regulations
CR	Condition Report
DC	Direct Current
DG	Diesel Generator
DRP	Division of Reactor Projects; Region RIII
DRS	Division of Reactor Safety
EAL	Emergency Action Level
EDG	Emergency Diesel Generator
EP	Emergency Preparedness
ERO	Emergency Response Organization
ESF	Engineered Safety Feature
GL	Generic Letter
HRA	High Radiation Area
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Inspection Report
ISI	Inservice Inspection
LCOAR	Limiting Condition for Operation Action Requirement
LER	Licensee Event Report
MR	Maintenance Rule
MSIV	Main Steam Isolation Valve
NCV	Non-Cited Violation
NOS	Nuclear Oversight
NOUE	Notification of Unusual Event
NRC	United States Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
ODCM	Offsite Dose Calculation Manual
PARS	Public Availability Records
PI	Performance Indicator
PWR	Pressurized Water Reactor
RCS	Reactor Coolant System
RETS	Radiological Environmental Technical Specifications
RP	Radiation Protection
RWST	Refueling Water Storage Tank
SA	Service Air
SDP	Significance Determination Process
SG	Steam Generator
SSC	Structure, System and Component
SX	Essential Service Water
TI	Temporary Inspection
TS	Technical Specification

UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
VHRA	Very High Radiation Area
WO	Work Order
WR	Work Request