



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

REGION III  
2443 WARRENVILLE ROAD, SUITE 210  
LISLE, IL 60532-4352

January 26, 2010

Mr. Charles G. Pardee  
Senior Vice President, Exelon Generation Company, LLC  
President and Chief Nuclear Officer (CNO), Exelon Nuclear  
4300 Winfield Road  
Warrenville IL 60555

**SUBJECT: BYRON STATION, UNITS 1 AND 2, INTEGRATED INSPECTION  
REPORT 05000454/2009005; 05000455/2009005**

Dear Mr. Pardee:

On December 31, 2009, the U.S. Nuclear Regulatory Commission (NRC) completed an integrated inspection at your Byron Station, Units 1 and 2. The enclosed inspection report documents the inspection findings which were discussed on January 8, 2010, with Mr. D. Enright 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, two NRC-identified findings of very low safety significance (Green) were identified. These findings were determined to involve violations of NRC requirements. However, because of their very low safety significance, and because the issues were entered into your corrective action program, the NRC is treating these issues as Non-Cited Violations in accordance with Section VI.A.1 of the NRC 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, 2443 Warrenville Road, Suite 210, Lisle, IL 60532-4352; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the Resident Inspector Office at the Byron Station. In addition, if you disagree with the characterization of any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region III, and the NRC Resident Inspector at Byron Station. The information you provide will be considered in accordance with Inspection Manual Chapter 0305.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS), 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 No. 05000454/2009-005 and 05000455/2009-005  
w/Attachment: Supplemental Information

cc w/encl: Distribution via ListServ

U. S. NUCLEAR REGULATORY COMMISSION

REGION III

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

Report Nos: 05000454/2009005 and 05000455/2009005

Licensee: Exelon Generation Company, LLC

Facility: Byron Station, Units 1 and 2

Location: Byron, IL

Dates: October 01, 2009, through December 31, 2009

Inspectors: B. Bartlett, Senior Resident Inspector  
J. Robbins, Resident Inspector  
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Branch 3  
Division of Reactor Projects

Enclosure

## TABLE OF CONTENTS

SUMMARY OF FINDINGS .....	1
REPORT DETAILS .....	3
Summary of Plant Status.....	3
1. REACTOR SAFETY .....	3
1R01    Adverse Weather Protection (71111.01) .....	3
1R04    Equipment Alignment (71111.04) .....	4
1R05    Fire Protection (71111.05).....	4
1R06    Flooding (71111.06) .....	6
1R11    Licensed Operator Requalification Program (71111.11) .....	6
1R12    Maintenance Effectiveness (71111.12) .....	7
1R13    Maintenance Risk Assessments and Emergent Work Control (71111.13)..	8
1R15    Operability Evaluations (71111.15) .....	9
1R18    Plant Modifications (71111.18) .....	10
1R19    Post-Maintenance Testing (71111.19) .....	10
1R20    Outage Activities (71111.20) .....	11
1R22    Surveillance Testing (71111.22).....	14
1EP4    Emergency Action Level and Emergency Plan Changes (71114.04).....	15
2. RADIATION SAFETY .....	17
2PS3    Radiological Environmental Monitoring Program And Radioactive Material Control Program (71122.03).....	17
4. OTHER ACTIVITIES.....	20
4OA1    Performance Indicator Verification (71151) .....	20
4OA2    Identification and Resolution of Problems (71152) .....	23
4OA5    Other Activities .....	25
4OA6    Management Meetings .....	29
SUPPLEMENTAL INFORMATION .....	1
Key Points of Contact.....	1
List of Items Opened, Closed and Discussed.....	1
List of Documents Reviewed .....	2
List of Acronyms Used .....	9

## SUMMARY OF FINDINGS

IR 05000454/2009005, 05000454/2009005; October 1, 2009 – December 31, 2009; Byron Station, Units 1 & 2; Refueling Outage Activities and Emergency Action Level and Emergency Plan Changes

This report covers a 3-month period of inspection by resident inspectors and announced baseline inspections by regional inspectors. Two Green findings were identified by the inspectors. The findings were considered Non-Cited Violations (NCVs) of NRC regulations. 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 4, dated December 2006.

### A. NRC-Identified and Self-Revealed Findings

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

- Green. The inspectors identified a finding of very low safety significance and the associated NCV of 10 CFR Part 26.203(b)(2), "Procedures," for the licensee's failure to adhere to work hour rule procedures. Specifically, a licensed reactor operator who was working an outage work hour schedule on Unit 1 was assigned as the online unit, Unit 2, Assist Operator without meeting the online work hour requirements. Subsequently, the licensee clarified the requirements for scheduling personnel and entered this issue into their corrective action (CAP) program as Issue Report (IR) 882727.

The finding was more than minor because the finding could lead to a more significant safety concern. The finding is of very low safety significance because there were other operators in the control room that satisfied the work hours requirements and the operators were required to perform peer check before any control room equipment manipulation were taken. This finding has a cross-cutting aspect in the area of Human Performance, Resources Component (H.2(b)), because there were insufficient qualified personnel to maintain work hours within the working hour's guidelines. (Section 1R20.1)

#### **Cornerstone: Public Radiation Safety**

- Green. The inspectors identified a finding of very low safety significance and the associated NCV of 10 CFR Part 20, Appendix G, Section III.A.3. Specifically, the licensee did not establish a Quality Assurance Program sufficiently to assure conformance with 10 CFR 61.55, in that, the program was not adequate to identify incorrect waste stream data was used to determine the concentrations of radionuclides, and ultimately ensure waste was properly classified, in accordance with 10 CFR 61.55. The licensee entered the deficiency into its CAP (IR 950082) and re-evaluated these shipments using the appropriate waste stream radionuclide distribution and correctly determined that the waste classification remained Class C.

The failure to establish an adequate 10 CFR Part 61 Quality Assurance Program, to assure conformance with 10 CFR 61.55, is a performance deficiency that was reasonably within the licensee's ability to foresee and correct, which should have been

prevented. The finding is more than minor because, if left uncorrected the performance deficiency could have the potential to lead to a more significant safety concern. This finding was determined to be of very low safety-significance because no radiation limits were exceeded, there was no breach of packaging, there was no package certificate of compliance finding, there was no low level burial ground non-conformance, and no failure to make notifications or provide emergency information. The cause of this finding was related to the cross-cutting area of Human Performance, Resources (H.2(b)) due to insufficient number of qualified shipping personnel. (Section 4OA5.1)

**B. Licensee-Identified Violations**

None.

## REPORT DETAILS

### Summary of Plant Status

Unit 1 completed its refueling outage on October 8, 2009. The unit operated at or near full power for the remainder of the inspection period.

Unit 2 operated at or near full power through most of the inspection period with one exception. On November 21, 2009, the licensee reduced power to 86 percent for scheduled surveillance testing associated with the main turbine and planned feedwater pump swaps. The unit returned to full power the following day.

### **1. REACTOR SAFETY**

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

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

##### .1 Impending Cold Weather Preparations

##### a. Inspection Scope

The inspectors conducted a review of the licensee's preparations for winter conditions to verify that the plant's design features and implementation of procedures were sufficient to protect mitigating systems from the effects of adverse weather. Documentation for selected risk-significant systems was reviewed to ensure that these systems would remain functional when challenged by inclement weather. During the inspection, the inspectors focused on plant specific design features and the licensee's procedures used to mitigate or respond to adverse weather conditions. Additionally, the inspectors reviewed the Updated Final Safety Analysis Report (UFSAR) and performance requirements for systems selected for inspection, and verified that operator actions were appropriate as specified by plant specific procedures. Cold weather protection, such as heat tracing and area heaters, was verified to be in operation where applicable. The inspectors also reviewed the corrective action program (CAP) items to verify that the licensee was identifying adverse weather issues at an appropriate threshold and entering them into their CAP in accordance with station corrective action procedures. Specific documents reviewed during this inspection are listed in the Attachment. The inspectors' reviews focused specifically on the following plant systems due to their risk significance or susceptibility to cold weather issues:

- Station Heating System;
- Auxiliary Building Heating, Ventilation and Air Conditioning (HVAC) system; and
- Essential Service Water Valve House HVAC.

This inspection constituted one impending adverse weather sample as defined in Inspection Procedure (IP) 71111.01-05.

##### b. Findings

No findings of significance were identified.

1R04 Equipment Alignment (71111.04)

.1 Quarterly Partial System Walkdowns

a. Inspection Scope

The inspectors performed partial system walkdowns of the following risk-significant systems:

- Unit 0 Component Cooling Water System (CC) Heat Exchanger while Unit 1 CC Heat Exchanger was Out-of-Service for Planned Work;
- Unit 1 Train B Safety Injection System After Maintenance;
- Unit 2 Train A Diesel Generator (DG) while Unit 2 Train B DG Out-of-Service for Planned Work;
- Unit 2 Train A Main Feedwater Pump Following Extended Maintenance; and
- Unit 1 Train B DG while Unit 2 Train B DG Out-of-Service for Planned Work.

The inspectors selected these systems based on their risk significance relative to the Reactor Safety Cornerstones at the time they were inspected. The inspectors attempted to identify any discrepancies that could impact the function of the system, and, therefore, potentially increase risk. The inspectors reviewed applicable operating procedures, system diagrams, UFSAR, Technical Specification (TS) requirements, outstanding work orders, condition reports, and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have rendered the systems incapable of performing their intended functions. The inspectors also walked down accessible portions of the systems to verify system components and support equipment were aligned correctly and operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no obvious deficiencies. The inspectors also verified that the licensee had properly identified and resolved equipment alignment problems that could cause initiating events or impact the capability of mitigating systems or barriers and entered them into the CAP with the appropriate significance characterization. Documents reviewed are listed in the Attachment.

These activities constituted five partial system walkdown samples as defined in IP 71111.04-05.

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05)

.1 Routine Resident Inspector Tours (71111.05Q)

a. Inspection Scope

The inspectors conducted fire protection walkdowns which were focused on availability, accessibility, and the condition of firefighting equipment in the following risk-significant plant areas:



- Unit 1 Division 11 Switchgear Room (Zone 5.2-1);
- Unit 2 Division 21 Switchgear Room (Zone 8.3-1);
- Unit 1 and Unit 2 Diesel Generator Tunnels (Zones 3.1-1 and 3.1-2);
- Fuel Handling Building (Zone 12.1-0);
- Laundry Room (Zone 11.6C-0);
- Auxiliary Building Ventilation Areas (Zones 11.7-0 and 11.7-2); and
- Unit 2 Upper Cable Spreading Room (Zones 3.3A-2, 3.3B2, and 3.3D2).

The inspectors reviewed areas to assess if the licensee had implemented a fire protection program that adequately controlled combustibles and ignition sources within the plant, effectively maintained fire detection and suppression capability, maintained passive fire protection features in good material condition, and implemented adequate compensatory measures for out-of-service, degraded or inoperable fire protection equipment, systems, or features in accordance with the licensee's fire plan. The inspectors selected fire areas based on their overall contribution to internal fire risk as documented in the plant's Individual Plant Examination of External Events with later additional insights, their potential to impact equipment which could initiate or mitigate a plant transient, or their impact on the plant's ability to respond to a security event. Using the documents listed in the Attachment, 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 fire doors, dampers, and penetration seals appeared to be in satisfactory condition. The inspectors also verified that minor issues identified during the inspection were entered into the licensee's CAP. Documents reviewed are listed in the Attachment to this report.

These activities constituted seven quarterly fire protection inspection samples as defined in IP 71111.05-05.

b. Findings

No findings of significance were identified.

.2 Annual Fire Protection Drill Observation (71111.05A)

a. Inspection Scope

On October 28, 2009, the inspectors observed a fire brigade activation for an unannounced fire drill in the Unit 1 Auxiliary Boiler Room. Based on this observation, the inspectors evaluated the readiness of the plant fire brigade to fight fires. The inspectors verified that the licensee staff identified deficiencies; openly discussed them in a self-critical manner at the drill debrief, and took appropriate corrective actions. Specific attributes evaluated were: (1) proper wearing of turnout gear and self-contained breathing apparatus; (2) proper use and layout of fire hoses; (3) employment of appropriate fire fighting techniques; (4) sufficient firefighting equipment brought to the scene; (5) effectiveness of fire brigade leader communications, command, and control; (6) search for victims and propagation of the fire into other plant areas; (7) smoke removal operations; (8) utilization of pre planned strategies; (9) adherence to the pre planned drill scenario; and (10) drill objectives. Documents reviewed are listed in the Attachment to this report.

These activities constituted one annual fire protection inspection sample as defined in IP 71111.05-05.

b. Findings

No findings of significance were identified.

1R06 Flooding (71111.06)

.1 Underground Vaults

a. Inspection Scope

The inspectors selected underground bunkers/manholes subject to flooding that contained cables whose failure could disable risk-significant equipment. The inspectors determined that the cables were not submerged, that splices were intact, and that appropriate cable support structures were in place. In those areas where dewatering devices were used, such as a sump pump, the device was operable and level alarm circuits were set appropriately to ensure that the cables would not be submerged. In those areas without dewatering devices, the inspectors verified that drainage of the area was available, or that the cables were qualified for submergence conditions. The inspectors also reviewed the licensee's corrective action documents with respect to past submerged cable issues identified in the corrective action program to verify the adequacy of the corrective actions. Documents reviewed are listed in the Attachment to this report. The inspectors performed a walkdown of the following underground bunkers/manholes subject to flooding:

- Essential Service Water Valve 0SX138A Valve Pit;
- Unit 2 Containment Tendon Gallery; and
- River Screenhouse Circulating Water Makeup Pump Pit.

This inspection constituted one underground vault sample as defined in IP 71111.06-05.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification Program (71111.11)

.1 Resident Inspector Quarterly Review (71111.11Q)

a. Inspection Scope

On October 20, 2009, the inspectors observed a crew of licensed operators in the plant's simulator during licensed operator requalification examinations to verify that operator performance was adequate, evaluators were identifying and documenting crew performance problems, and training was being conducted in accordance with licensee procedures. The inspectors evaluated the following areas:

- licensed operator performance;
- crew's clarity and formality of communications;

- ability to take timely actions in the conservative direction;
- prioritization, interpretation, and verification of annunciator alarms;
- correct use and implementation of abnormal and emergency procedures;
- control board manipulations;
- oversight and direction from supervisors; and
- ability to identify and implement appropriate TS actions and Emergency Plan actions and notifications.

The crew's performance in these areas was compared to pre-established operator action expectations and successful critical task completion requirements. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one quarterly licensed operator requalification program sample as defined in IP 71111.11.

b. Findings

No findings of significance were identified.

.2 Annual Operating Test Results and Biennial Written Examination Results (71111.11B)

a. Inspection Scope

The inspectors reviewed the overall pass/fail results of the individual Job Performance Measure operating tests, and the simulator operating tests, (required to be given per 10 CFR 55.59(a)(2)) administered by the licensee in 2009 as part of the licensee's operator licensing requalification cycle. These results were compared to the thresholds established in Inspection Manual Chapter 0609, Appendix I, "Licensed Operator Requalification Significance Determination Process (SDP)." The evaluations were also performed to determine if the licensee effectively implemented operator requalification guidelines established in NUREG 1021, "Operator Licensing Examination Standards for Power Reactors," and Inspection Procedure 71111.11, "Licensed Operator Requalification Program." The documents reviewed during this inspection are listed in the attachment.

This inspection constituted one inspection sample as defined in IP 71111.11.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12)

.1 Routine Quarterly Evaluations (71111.12Q)

a. Inspection Scope

The inspectors evaluated degraded performance issues involving the following risk-significant systems:

- Unit 1 Train B Centrifugal Charging Pump Performance Issues.

The inspectors reviewed events such as where ineffective equipment maintenance had resulted in valid or invalid automatic actuations of engineered safeguards systems and independently verified the licensee's actions to address system performance or condition problems in terms of the following:

- implementing appropriate work practices;
- identifying and addressing common cause failures;
- scoping of systems in accordance with 10 CFR 50.65(b) of the maintenance rule;
- characterizing system reliability issues for performance;
- charging unavailability for performance;
- trending key parameters for condition monitoring;
- ensuring 10 CFR 50.65(a)(1) or (a)(2) classification or re-classification; and
- verifying appropriate performance criteria for structures, systems, and components/functions classified as (a)(2) or appropriate and adequate goals and corrective actions for systems classified as (a)(1).

The inspectors assessed performance issues with respect to the reliability, availability, and condition monitoring of the system. In addition, the inspectors verified maintenance effectiveness issues were entered into the CAP with the appropriate significance characterization. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one quarterly maintenance effectiveness samples as defined in IP 71111.12-05.

b. Findings

No findings of significance were identified.

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

.1 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

The inspectors reviewed the licensee's evaluation and management of plant risk for the maintenance and emergent work activities affecting risk-significant and safety-related equipment listed below to verify that the appropriate risk assessments were performed prior to removing equipment for work:

- Planned maintenance during the week of December 14, 2009, which included Unit 2 Train A Main Feedwater Pump, Unit 2 Train A Residual Heat Removal Pump, and Unit 1 Train A Safety Injection Pump; and
- Planned maintenance during the week of December 7, 2009, including Unit 2 Train A Auxiliary Feedwater Valve 06A, 2A Condensate/Condensate Booster Pump, and Train A Control Room Chiller.

These activities were selected based on their potential risk significance relative to the Reactor Safety Cornerstones. As applicable for each activity, the inspectors verified that risk assessments were performed as required by 10 CFR 50.65(a)(4) and were accurate and complete. When emergent work was performed, the inspectors verified that the plant risk was promptly reassessed and managed. The inspectors reviewed the scope

of maintenance work, discussed the results of the assessment with the licensee's probabilistic risk analyst or shift technical advisor, and verified plant conditions were consistent with the risk assessment. The inspectors also reviewed TS requirements and walked down portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met.

These maintenance risk assessments and emergent work control activities constituted two samples as defined in IP 71111.13-05.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15)

.1 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the following issues:

- Unit 1 Safety Injection Pump Discharge Pressure Increase Due to Emergency Core Cooling System Check Valve Backleakage; and
- Unit 1 and Unit 2 Diesel Oil Storage Tank Levels Due to Possible Non-Conservatism in Calculations.

The inspectors selected these potential operability issues based on the risk significance of the associated components and systems. The inspectors evaluated the technical adequacy of the evaluations to ensure that TS operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the TS and UFSAR to the licensee's evaluations to determine whether the components or systems were operable. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled. The inspectors determined, where appropriate, compliance with bounding limitations associated with the evaluations. Additionally, the inspectors reviewed a sampling of corrective action documents to verify that the licensee was identifying and correcting any deficiencies associated with operability evaluations. Documents reviewed are listed in the Attachment to this report.

These operability inspections constituted two samples as defined in IP 71111.15-05.

b. Findings

No findings of significance were identified.

1R18 Plant Modifications (71111.18)

.1 Permanent Plant Modifications

a. Inspection Scope

The following engineering design package was reviewed and selected aspects were discussed with engineering personnel:

- Evaluate Larger Fuse Size for the Control Transformer Primary Circuit in Motor Control Center Cubicles with Size 3 Starters.

This document and related documentation were reviewed for adequacy of the associated 10 CFR 50.59 safety evaluation screening, consideration of design parameters, implementation of the modification, post-modification testing, and relevant procedures, design, and licensing documents were properly updated. The modification altered the current rating for the fuses on the primary side of the control power transformer located in cubicles with Size 3 Starters from 1.5 Amps to 3.0 Amps. The increase in current carrying capability was desired to eliminate nuisance fuse failures. Documents reviewed in the course of this inspection are listed in the Attachment to this report.

This inspection constituted one permanent plant modification samples as defined in IP 71111.18-05.

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing (71111.19)

.1 Post-Maintenance Testing

a. Inspection Scope

The inspectors reviewed the following post-maintenance (PM) activities to verify that procedures and test activities were adequate to ensure system operability and functional capability:

- Unit 2 Train A Essential Service Water Comprehensive Inservice Testing (IST) following Instrument Calibration;
- Unit 1 Train B Auxiliary Feedwater Pump following Grouting and Alignment Work;
- Unit 1 Intercept and Reheat Valve Strokes following Solenoid Replacement on Valve 1EH5003C; and
- 2B Diesel Generator following Routine Maintenance.

These activities were selected based upon the structure, system, or component's ability to impact risk. The inspectors evaluated these activities for the following (as applicable): the effect of testing on the plant had been adequately addressed; testing was adequate for the maintenance performed; acceptance criteria were clear and demonstrated operational readiness; test instrumentation was appropriate; tests were performed as

written in accordance with properly reviewed and approved procedures; equipment was returned to its operational status following testing (temporary modifications or jumpers required for test performance were properly removed after test completion); and test documentation was properly evaluated. The inspectors evaluated the activities against TS, the UFSAR, 10 CFR Part 50 requirements, licensee procedures, and various NRC generic communications to ensure that the test results adequately ensured that the equipment met the licensing basis and design requirements. In addition, the inspectors reviewed corrective action documents associated with post-maintenance tests to determine whether the licensee was identifying problems and entering them in the CAP and that the problems were being corrected commensurate with their importance to safety. Documents reviewed are listed in the Attachment to this report.

This inspection constituted four post-maintenance testing samples as defined in IP 71111.19-05.

b. Findings

No findings of significance were identified.

1R20 Outage Activities (71111.20)

.1 Refueling Outage Activities

a. Inspection Scope

The inspectors reviewed the outage schedule and contingency plans for the Unit 1 refueling outage (RFO), conducted from September 13, 2009, to October 8, 2009, to confirm that the licensee had appropriately considered risk, industry experience, and previous site-specific problems in developing and implementing a plan that assured maintenance of defense-in-depth. During the RFO, the inspectors observed portions of the shutdown and cooldown processes and monitored licensee controls over the outage activities listed below. Documents reviewed during the inspection are listed in the Attachment to this report.

- Licensee configuration management, including maintenance of defense-in-depth commensurate with the outage plan for key safety functions and compliance with the applicable TS when taking equipment out of service.
- Implementation of clearance activities and confirmation that tags were properly hung and equipment appropriately configured to safely support the work or testing.
- Installation and configuration of reactor coolant pressure, level, and temperature instruments to provide accurate indication, accounting for instrument error.
- Controls over the status and configuration of electrical systems to ensure that TS and outage requirements were met, and controls over switchyard activities.
- Monitoring of decay heat removal processes, systems, and components.
- Controls to ensure that outage work was not impacting the ability of the operators to operate the spent fuel pool cooling system.
- Reactor water inventory controls including flow paths, configurations, and alternative means for inventory addition, and controls to prevent inventory loss.
- Controls over activities that could affect reactivity.
- Refueling activities including fuel handling.

- Startup and ascension to full power operation, tracking of startup prerequisites, walkdown of the containment to verify that debris had not been left which could block emergency core cooling system suction strainers, and reactor physics testing.
- Licensee identification and resolution of problems related to RFO activities.

This inspection supplemented the RFO inspection sample credited in NRC Inspection Report 05000454/2009004; 05000455/2009004.

b. Findings

Introduction: The inspectors identified a Green finding of very low safety significance and the associated NCV of 10 CFR Part 26.203(b)(2), "Procedures," during a routine inspection of the control room on October 4, 2009. The inspectors observed a licensed reactor operator who was working an outage schedule on Unit 1 assigned as the online unit, Unit 2, Assist Operator.

Description: On October 4, 2009, the inspectors performed a routine control room inspection. While in the Unit 2 at-the-controls area, the inspectors observed an operator who was normally assigned to Unit 1, which was in a refueling outage. Discussions with the operator determined that he had been working an outage schedule on Unit 1 and when he came in to take his watch, he had been assigned to the operating unit. The operator stated that he had not had the required 2 days off prior to assuming an operating unit position. The operator had been informed by his management that short duration relief on the operating unit by outage unit personnel was allowed. Even though the operator and the management personnel discussed the fatigue rule he was still assigned to the operating unit. The operator had initiated an Issue Report (IR) as all questions had not been resolved. The operator had worked six 12-hour days and had 1 day off. He then worked two 12 hour days prior to taking the watch on the operating unit.

The operator questioned shift management about being placed on an operating unit. He was mistakenly informed that a review had determined that it was allowed for an outage operator to be placed on an operating unit. Another operator had also been moved over from the outage unit to the operating unit the night before. That operator had also not had the required 2 days off prior to working on the operating unit. That operator had also questioned if that was in accordance with the work hour rule. He too had been mistakenly informed that a review had determined that this was allowed. That operator, who had worked six 12-hour nights, had 1 night off and was then assigned to the operating unit. The inspectors questioned licensee management and informed them that while a more detailed review of the work hour rule was required, the inspectors believed that this practice was not allowed by the rule. Licensee management stated that they would assess the situation. Only afterwards did the inspectors determine that a third violation of the work hour rule occurred when, later that evening during the same shift, another outage unit operator was placed on the operating unit.

The inspectors reviewed the licensee's work hour rule procedures, specifically LS-AA-119-1002, "Scoping of Work Hour Limits." The procedure was written in accordance with the work hour rule and regulatory guidance. Step 4.3.3, "Outages," stated in part, "Workers not eligible to apply outage MDO [minimum days off] requirements that must maintain online requirements...Two (2) Reactor



Operators...assigned to the controls for each operating unit at a multi-unit station while the other unit is in an outage....” Procedure LS-AA-110 specifies that the MDO for the online unit is 2 days off per week. Furthermore, licensee procedures required that at least two reactor operators be assigned to the operating unit and maintain their work hours in accordance with operating unit limits.

Based on the observations, the inspectors determined that a reactor operator working the opposite unit refueling outage had been assigned to the operating unit on each of the three shifts. These shifts started on the night shift of October 3, continued through the day shift of October 4, with the last shift being the night shift of October 4. Licensee personnel had violated the work hour rule and licensee procedure when reactor operators working on the unit in outage were ordered to work the operating unit without having at least 2 days off. Subsequently, the licensee clarified the requirements for scheduling personnel and entered this issue into their CAP as IR 882727.

Analysis: The inspectors determined that the failure to adhere to work hour rule procedures was a performance deficiency warranting a significance evaluation. The inspectors concluded that the finding was more than minor in accordance with Appendix B, “Issue Screening,” of IMC 0612, “Power Reactor Inspection Reports,” dated September 20, 2007. It was more than minor because it did not meet any of the examples of minor findings in IMC 0612, Appendix E, and because the finding could lead to a more significant safety concern.

The finding is of very low safety significance because there were other operators in the control room that satisfied the work hours requirements and the operators were required to perform peer check before any control room equipment manipulation were taken. This finding has a cross-cutting aspect in the area of Human Performance, Resources Component, because there were insufficient qualified personnel to maintain work hours within the working hour guidelines. (H.2(b))

Enforcement: 10 CFR Part 26.203, requires, in part, “...licensees shall develop, implement, and maintain procedures that ... describe the process for implementing the controls required under 26.205 for the individuals who are performing the duties listed in 26.4(a).” The licensee’s work hour rule procedures, specifically Step 4.3.3 of LS-AA-119-1002, “Scoping of Work Hour Limits,” “Outages,” states in part that, “Workers not eligible to apply outage MDO [minimum days off] requirements that must maintain online requirements...Two (2) Reactor Operators...assigned to the controls for each operating unit at a multi-unit station while the other unit is in an outage....” Contrary to the above, on three occasions during night shift on October 3, 2009, day shift on October 4, 2009, and night shift on October 4, 2009, reactor operators working on the outage unit failed to take the minimum days off prior to assuming the controls for the online unit. However, because of the very low safety significance of the issue and because the issue has been entered into the licensee’s corrective action program, the issue is being treated as a NCV consistent with Section VI.A.1 of the NRC Enforcement Policy. (NCV 05000455/2009005-01)

1R22 Surveillance Testing (71111.22)

.1 Surveillance Testing

a. Inspection Scope

The inspectors reviewed the test results for the following activities to determine whether risk-significant systems and equipment were capable of performing their intended safety function and to verify testing was conducted in accordance with applicable procedural and TS requirements:

- Unit 1 N31/N35 Channel Operational Test;
- Unit 1 Rod Drop Timing Test;
- Unit 0 Train B Diesel Driven Fire Pump;
- Unit 2 Train B Containment Spray Pump Comprehensive Inservice Testing (IST)
- Unit 2 Train B Stroke Time Testing for Miscellaneous Essential Service Water Valves (IST) and
- Unit 1 Reactor Coolant System Leakage Surveillance.

The inspectors observed in-plant activities and reviewed procedures and associated records to determine the following:

- did preconditioning occur;
- were the effects of the testing adequately addressed by control room personnel or engineers prior to the commencement of the testing;
- were acceptance criteria clearly stated, demonstrated operational readiness, and consistent with the system design basis;
- plant equipment calibration was correct, accurate, and properly documented;
- as-left setpoints were within required ranges; and the calibration frequency were in accordance with TSs, the USAR, procedures, and applicable commitments;
- measuring and test equipment calibration was current;
- test equipment was used within the required range and accuracy; applicable prerequisites described in the test procedures were satisfied;
- test frequencies met TS requirements to demonstrate operability and reliability; tests were performed in accordance with the test procedures and other applicable procedures; jumpers and lifted leads were controlled and restored where used;
- test data and results were accurate, complete, within limits, and valid;
- test equipment was removed after testing;
- where applicable for inservice testing activities, testing was performed in accordance with the applicable version of Section XI, American Society of Mechanical Engineers code, and reference values were consistent with the system design basis;
- where applicable, test results not meeting acceptance criteria were addressed with an adequate operability evaluation or the system or component was declared inoperable;
- where applicable for safety-related instrument control surveillance tests, reference setting data were accurately incorporated in the test procedure;
- where applicable, actual conditions encountering high resistance electrical contacts were such that the intended safety function could still be accomplished;

- prior procedure changes had not provided an opportunity to identify problems encountered during the performance of the surveillance or calibration test;
- equipment was returned to a position or status required to support the performance of its safety functions; and
- all problems identified during the testing were appropriately documented and dispositioned in the CAP.

Documents reviewed are listed in the Attachment to this report.

This inspection constituted three routine surveillance testing samples, two inservice testing samples, and one reactor coolant system leak detection inspection sample, as defined in IP 71111.22, Sections -02 and -05.

b. Findings

No findings of significance were identified.

**Cornerstone: Emergency Preparedness**

1EP4 Emergency Action Level and Emergency Plan Changes (71114.04)

.1 Emergency Action Level and Emergency Plan Changes

a. Inspection Scope

Since the last NRC inspection of this program area, Emergency Plan Annex, Revisions 22, 23, and 24 were implemented based on the licensee's determination, in accordance with 10 CFR 50.54(q), that the changes resulted in no decrease in effectiveness of the Plan, and that the revised Plan as changed continues to meet the requirements of 10 CFR 50.47(b) and Appendix E to 10 CFR Part 50. The inspectors conducted a sampling review of the Emergency Plan changes and a review of the Emergency Action Level (EAL) changes to evaluate for potential decreases in effectiveness of the Plan. However, this review does not constitute formal NRC approval of the changes. Therefore, these changes remain subject to future NRC inspection in their entirety.

This emergency action level and emergency plan changes inspection constituted one sample as defined in IP 71114.04-05.

b. Findings

(1) Changes to EAL HU6 Potentially Decrease the Effectiveness of the Plans without Prior NRC Approval

Introduction: The inspectors reviewed changes implemented to the Byron Station Emergency Plan Annex EALs and EAL Basis. In Revision 22, the licensee changed the basis of EAL HU6, "Fire not extinguished within 15 minutes of detection within the protected area boundary by adding two statements. The two changes added to the EAL basis stated that if the alarm could not be verified by redundant control room or nearby fire panel indications, notification from the field that a fire exists, it will start the 15-minute classification and fire extinguishment clocks. The second change stated the 15-minute

period to extinguish the fire does not start until either the fire alarm is verified to be valid by additional control room or nearby fire panel instrumentation, or upon notification of a fire from the field. These statements conflict with the previous Byron Station Annex, Revision 21, basis statements and potentially decrease the effectiveness of the Plans.

Description: Byron Station Radiological Emergency Plan Annex, Revision 21, EAL HU6, initiating condition stated, "Fire not extinguished within 15 minutes of detection, or explosion, within the protected area boundary." The threshold values for HU6 were, in part: 1) Fire in any Table H2 area not extinguished within 15 minutes of Control Room notification or verification of a Control Room alarm; or 2) Fire outside any Table H2 area with the potential to damage safety systems in any Table H2 area not extinguished within 15 minutes of Control Room notification or verification of a Control Room alarm. Table H2, Vital Areas, were identified as containment, auxiliary building, fuel handling building, main steam tunnels, essential service water cooling towers, condensate storage tanks, and reactor water storage tanks. The basis defined fire as "combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute fires. Observation of flame is preferred but is not required if large quantities of smoke and heat are observed."

The basis for Revision 21, EAL HU6 Thresholds 1 and 2 stated, in part that, the purpose of this threshold is to address the magnitude and extent of fires that may be potentially significant precursors to damage to safety systems. As used here, notification is visual observation and report by plant personnel or sensor alarm indication. The 15-minute period begins with a credible notification that a fire is occurring or indication of a valid fire detection system alarm. A verified alarm is assumed to be an indication of a fire unless personnel dispatched to the scene disprove the alarm within the 15-minute period. The report, however, shall not be required to verify the alarm. The intent of the 15-minute period is to size the fire and discriminate against small fires that are readily extinguished (e.g., smoldering waste paper basket, etc.).

Revision 22 of the Byron Station Radiological Emergency Plan Annex, changed the threshold basis for EAL HU6 by adding the following two statements: 1) "If the alarm cannot be verified by redundant control room or nearby fire panel indications, notification from the field that a fire exists starts the 15-minute classification and fire extinguishment clocks," and 2) "The 15-minute period to extinguish the fire does not start until either the fire alarm is verified to be valid by utilization of additional control room or nearby fire panel instrumentation, or upon notification of a fire from the field."

The two statements added to the basis in Revision 22 conflict with the Revision 21 threshold basis and initiating condition. The changed threshold basis in Revision 22 could add an indeterminate amount of time to declaring an actual emergency until a person responded to the area of the fire and made a notification to the control room of a fire in the event that redundant control room or nearby fire panel indications were not available.

Pending further review and verification by the NRC to determine if the changes to EAL HU6 threshold basis potentially decreased the effectiveness of the Plans, this issue was considered an Unresolved Item (URI) (URI 05000454/2009005-02, 05000455/2009005-02).

## 2. RADIATION SAFETY

### Cornerstone: Public Radiation Safety

#### 2PS3 Radiological Environmental Monitoring Program And Radioactive Material Control Program (71122.03)

##### .1 Inspection Planning

###### a. Inspection Scope

The inspectors reviewed the most current Annual Environmental Monitoring Report and licensee assessment results to verify that the Radiological Environmental Monitoring Program (REMP) was implemented as required by TS and the Offsite Dose Calculation Manual (ODCM). The inspectors reviewed the report for changes to the ODCM with respect to environmental monitoring, commitments in terms of sampling locations, monitoring and measurement frequencies, land use census, interlaboratory comparison program, and analysis of data. The inspectors reviewed the ODCM to identify environmental monitoring stations and reviewed licensee self-assessments, audits, Licensee Event Reports (LERs), and interlaboratory comparison program results. The inspectors reviewed the UFSAR for information regarding the environmental monitoring program and meteorological monitoring instrumentation. The inspectors reviewed the scope of the licensee's audit program to verify that it met the requirements of 10 CFR 20.1101(c). Documents reviewed are listed in the Attachment to this report.

This inspection constituted one sample as defined in IP 71122.03-5.

###### b. Findings

No findings of significance were identified.

##### .2 Onsite Inspection

###### a. Inspection Scope

The inspectors' walked-down 30 percent of the air sampling stations and approximately 10 percent of the thermoluminescence dosimeter (TLD) monitoring stations to determine whether they were located as described in the ODCM and to determine the equipment material condition.

This inspection constituted one sample as defined in IP 71122.03-5.

The inspectors observed the collection and preparation of a variety of environmental samples (e.g., ground and surface water, milk, vegetation, sediment, and soil) and verified that environmental sampling was representative of the release pathways as specified in the ODCM and that sampling techniques were in accordance with procedures.

This inspection constituted one sample as defined in IP 71122.03-5.

The inspectors verified that the meteorological instruments were operable, calibrated, and maintained in accordance with guidance contained in the UFSAR, NRC Safety Guide 23, and licensee procedures. The inspectors verified that the meteorological data readout and recording instruments in the control room and at the tower were operable. The inspectors compared readout data (i.e., wind speed, wind direction, and delta temperature) in the control room and at the meteorological tower to identify if there were any line loss differences.

This inspection constituted one sample as defined in IP 71122.03-5.

The inspectors reviewed each event documented in the Annual Environmental Monitoring Report, which involved a missed sample, inoperable sampler, lost TLD, or anomalous measurement for the cause and corrective actions and conducted a review of the licensee's assessment of any positive sample results (i.e., licensed radioactive material detected above the lower limits of detection (LLDs)). The inspectors reviewed the associated radioactive effluent release data that was the likely source of the released material.

This inspection constituted one sample as defined in IP 71122.03-5.

The inspectors reviewed significant changes made by the licensee to the ODCM as the result of changes to the land census or sampler station modifications since the last inspection. The inspectors reviewed technical justifications for changed sampling locations. The inspectors verified that the licensee performed the reviews required to ensure that the changes did not affect its ability to monitor the impacts of radioactive effluent releases on the environment.

This inspection constituted one sample as defined in IP 71122.03-5.

The inspectors reviewed the calibration and maintenance records for four air samplers and composite water samplers. The inspectors reviewed calibration records for the environmental sample radiation measurement instrumentation (i.e., count room). The inspectors verified that the appropriate detection sensitivities with respect to TS/ODCM were utilized for counting samples (i.e., the samples meet the TS/ODCM required LLDs). The inspectors reviewed quality control charts for maintaining radiation measurement instrument status and actions taken for degrading detector performance.

The inspectors reviewed the results of the REMP sample vendor's quality control program including the interlaboratory comparison program to verify the adequacy of the vendor's program and the corrective actions for any identified deficiencies. The inspectors reviewed audits and technical evaluations the licensee performed on the vendor's program. The inspectors reviewed audit results of the program to determine whether the licensee met the TS/ODCM requirements.

This inspection constituted one sample as defined in IP 71122.03-5.

Documents reviewed are listed in the Attachment to this report.

b. Findings

No findings of significance were identified.

### .3 Unrestricted Release of Material from the Radiologically Controlled Area

#### a. Inspection Scope

The inspectors observed several locations where the licensee monitors potentially contaminated material leaving the Radiologically Controlled Area, and inspected the methods used for control, survey, and release from these areas. The inspectors observed the performance of personnel surveying and releasing material for unrestricted use to verify that the work was performed in accordance with plant procedures.

This inspection constituted one sample as defined in IP 71122.03-5.

The inspectors verified that the radiation monitoring instrumentation was appropriate for the radiation types present and was calibrated with appropriate radiation sources. The inspectors reviewed the licensee's criteria for the survey and release of potentially contaminated material and verified that there was guidance on how to respond to an alarm which indicates the presence of licensed radioactive material. The inspectors reviewed the licensee's equipment to ensure the radiation detection sensitivities were consistent with the NRC guidance contained in IE Circular 81-07 and IE Information Notice 85-92 for surface contamination and HPPOS-221 for volumetrically contaminated material. The inspectors verified that the licensee performed radiation surveys to detect radionuclides that decay via electron capture. The inspectors reviewed the licensee's procedures and records to verify that the radiation detection instrumentation was used at its typical sensitivity level based on appropriate counting parameters (i.e., counting times and background radiation levels). The inspectors verified that the licensee had not established a "release limit" by altering the instrument's typical sensitivity through such methods as raising the energy discriminator level or locating the instrument in a high radiation background area. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one sample as defined in IP 71122.03-5.

#### b. Findings

No findings of significance were identified.

### .4 Identification and Resolution of Problems

#### a. Inspection Scope

The inspectors reviewed the licensee's self assessments, audits, LERs, and Special Reports related to the radiological environmental monitoring program since the last inspection to determine if identified problems were entered into the CAP for resolution. The inspectors also verified that the licensee's self-assessment program was capable of identifying repetitive deficiencies or significant individual deficiencies in problem identification and resolution.

The inspectors also reviewed corrective action reports from the radioactive effluent treatment and environmental monitoring program since the previous inspection, interviewed staff and reviewed documents to determine if the following activities were

being conducted in an effective and timely manner commensurate with their importance to safety and risk:

- initial problem identification, characterization, and tracking;
- disposition of operability/reportability issues;
- evaluation of safety significance/risk and priority for resolution;
- identification of repetitive problems;
- identification of contributing causes;
- identification and implementation of effective corrective actions;
- resolution of NCVs tracked in the corrective action system; and
- implementation/consideration of risk significant operational experience feedback.

Documents reviewed are listed in the Attachment to this report.

This inspection constituted one sample as defined in IP 71122.03-5.

b. Findings

No findings of significance were identified.

**4. OTHER ACTIVITIES**

4OA1 Performance Indicator Verification (71151)

.1 Mitigating Systems Performance Index - Emergency AC Power System

a. Inspection Scope

The inspectors sampled licensee submittals for the Mitigating Systems Performance Index (MSPI) - Emergency AC Power System PI for Unit 1 and Unit 2 for the period from the October 01, 2008, through September 30, 2009. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the Nuclear Energy Institute (NEI) Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 5, were used. The inspectors reviewed the licensee's operator narrative logs, MSPI derivation reports, issue reports, event reports and NRC Integrated Inspection Reports for the period of October 01, 2008, through September 30, 2009, to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, that the change was in accordance with applicable NEI guidance. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator and none were identified. Documents reviewed are listed in the Attachment to this report.

This inspection constituted two MSPI emergency AC power system sample as defined in IP 71151-05.

b. Findings

No findings of significance were identified.



.2 Mitigating Systems Performance Index - High Pressure Injection Systems

a. Inspection Scope

The inspectors sampled licensee submittals for the MSPI - High Pressure Injection Systems PI for Unit 1 and Unit 2 from October 1, 2008, through September 30, 2009. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the Nuclear Energy Institute (NEI) Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 5, were used. The inspectors reviewed the licensee's operator narrative logs, issue reports, MSPI derivation reports, event reports, and NRC Integrated Inspection Reports for the period of October 1, 2008, through September 30, 2009, to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, that the change was in accordance with applicable NEI guidance. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator and none were identified. Documents reviewed are listed in the Attachment to this report.

This inspection constituted two MSPI high pressure injection system sample as defined in IP 71151-05.

b. Findings

No findings of significance were identified.

.3 Mitigating Systems Performance Index - Heat Removal System

a. Inspection Scope

The inspectors sampled licensee submittals for the MSPI - Heat Removal System PI for Unit 1 and Unit 2, for the period from the October 1, 2008, through September 30, 2009. To determine the accuracy of the PI data reported during those periods, PI definitions, and guidance contained in the Nuclear Energy Institute (NEI) Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 5, were used. The inspectors reviewed the licensee's operator narrative logs, issue reports, event reports, MSPI derivation reports, and NRC Integrated Inspection Reports for the period of October 1, 2008, through September 30, 2009, to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, that the change was in accordance with applicable NEI guidance. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator and none were identified. Documents reviewed are listed in the Attachment to this report.

This inspection constituted two MSPI heat removal system sample as defined in IP 71151-05.

b. Findings

No findings of significance were identified.

.4 Mitigating Systems Performance Index - Residual Heat Removal System

a. Inspection Scope

The inspectors sampled licensee submittals for the MSPI - Residual Heat Removal System PI for Unit 1 and Unit 2, for the period from the October 1, 2008, through September 30, 2009. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the Nuclear Energy Institute (NEI) Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 5, were used. The inspectors reviewed the licensee's operator narrative logs, issue reports, MSPI derivation reports, event reports, and NRC Integrated Inspection Reports for the period of October 1, 2008, through September 30, 2009, to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, that the change was in accordance with applicable NEI guidance. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator and none were identified. Documents reviewed are listed in the Attachment to this report.

This inspection constituted two MSPI residual heat removal system sample as defined in IP 71151-05.

b. Findings

No findings of significance were identified.

.5 Mitigating Systems Performance Index - Cooling Water Systems

a. Inspection Scope

The inspectors sampled licensee submittals for the MSPI - Cooling Water Systems PI for Unit 1 and Unit 2 for the period of October 1, 2008, through September 30, 2009. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the Nuclear Energy Institute (NEI) Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 5, was used. The inspectors reviewed the licensee's operator narrative logs, issue reports, MSPI derivation reports, event reports, and NRC Integrated Inspection Reports for the period of October 1, 2008, through September 30, 2009, to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, that the change was in accordance with applicable NEI guidance. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator and none were identified. Documents reviewed are listed in the Attachment to this report.

This inspection constituted two MSPI cooling water system sample as defined in IP 71151-05.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems (71152)

**Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, Emergency Preparedness, Public Radiation Safety, Occupational Radiation Safety, and Security**

.1 Routine Review of Items Entered into the Corrective Action Program

a. Inspection Scope

As part of the various baseline inspection procedures 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 CAP at an appropriate threshold, that adequate attention was being given to timely corrective actions, and that adverse trends were identified and addressed. Attributes reviewed included: the complete and accurate identification of the problem; that timeliness was commensurate with the safety significance; that evaluation and disposition of performance issues, generic implications, common causes, contributing factors, root causes, extent-of-condition reviews, and previous occurrences reviews were proper and adequate; and that the classification, prioritization, focus, and timeliness of corrective actions were commensurate with safety and sufficient to prevent recurrence of the issue. Minor issues entered into the licensee's CAP as a result of the inspectors' observations are included in the attached List of Documents Reviewed.

These routine reviews for the identification and resolution of problems did not constitute any additional inspection samples. Instead, by procedure they were considered an integral part of the inspections performed during the quarter and documented in Section 1 of this report.

b. Findings

No findings of significance were identified.

.2 Daily Corrective Action Program Reviews

a. Inspection Scope

In order to assist with the identification of repetitive equipment failures and specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the licensee's CAP. This review was accomplished through inspection of the station's daily condition report packages.

These daily reviews were performed by procedure as part of the inspectors' daily plant status monitoring activities and, as such, did not constitute any separate inspection samples.

b. Findings

No findings of significance were identified.

.3 Semi-Annual Trend Review

a. Inspection Scope

The inspectors performed a review of the licensee's CAP and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors' review was focused on repetitive equipment issues, but also considered the results of daily inspector CAP item screening discussed in Section 4OA2.2 above, licensee trending efforts, and licensee human performance results. The inspectors' review nominally considered the 6-month period of June 1, 2009, through November 30, 2009, although some examples expanded beyond those dates where the scope of the trend warranted.

The review also included issues documented outside the normal CAP including: major equipment problem lists, repetitive and/or rework maintenance lists, departmental problem/challenges lists, system health reports, quality assurance audit/surveillance reports, self assessment reports, and Maintenance Rule assessments. The inspectors compared and contrasted their results with the results contained in the licensee's CAP trending reports. Corrective actions associated with a sample of the issues identified in the licensee's trending reports were reviewed for adequacy. Documents reviewed are listed in the Attachment to this report.

This review constituted a single semi-annual trend inspection sample as defined in IP 71152-05.

b. Findings

No findings of significance were identified.

.4 Annual Sample: Review of Operator Workarounds

a. Inspection Scope

The inspectors evaluated the licensee's implementation of their process used to identify, document, track, and resolve operational challenges. Inspection activities included, but were not limited to, a review of the cumulative effects of the Operator Workarounds (OWAs) on system availability and the potential for improper operation of the system, for potential impacts on multiple systems, and on the ability of operators to respond to plant transients or accidents.

The inspectors performed a review of the cumulative effects of OWAs. The documents listed in the Attachment were reviewed to accomplish the objectives of the inspection procedure. The inspectors reviewed both current and historical operational challenge records to determine whether the licensee was identifying operator challenges at an appropriate threshold, had entered them into their CAP and proposed or implemented appropriate and timely corrective actions which addressed each issue. Reviews were conducted to determine if any operator challenge could increase the possibility of an

Initiating Event, if the challenge was contrary to training, required a change from long-standing operational practices, or created the potential for inappropriate compensatory actions. Additionally, all temporary modifications were reviewed to identify any potential effect on the functionality of Mitigating Systems, impaired access to equipment, or required equipment uses for which the equipment was not designed. Daily plant and equipment status logs, degraded instrument logs, and operator aids or tools being used to compensate for material deficiencies were also assessed to identify any potential sources of unidentified operator workarounds.

This review constituted one operator workaround annual inspection sample as defined in IP 71152-05.

b. Findings

No findings of significance were identified.

40A5 Other Activities

.1 Closure of Unresolved Item 05000454/2009004-01; 05000455/2009004-01

a. Inspection Scope

The inspectors reviewed the licensee's evaluation of several radioactive waste shipments that occurred at the end of 2007 and 2008. This evaluation was performed because the inspectors' previous assessment of the shipments determined that there appeared to be discrepancies with radionuclide activities reported on the shipping manifests and the associated 10 CFR Part 61 analysis for the most appropriate waste stream for the contents of the shipments. This issue was characterized as an Unresolved Item (URI) (URI 05000454/2009004-01; 05000455/2009004-01).

b. Findings

Introduction: An NRC-identified finding of very low safety-significance (Green) and an associated NCV of 10 CFR Part 20, Appendix G, Section III.A.3, was identified for failure to establish a quality assurance program that was sufficient to assure conformance with 10 CFR Part 61. Specifically, the licensee's 10 CFR Part 61 Quality Assurance Program was not of sufficient depth to identify incorrect waste stream data was used to determine the concentrations of radionuclides, and ultimately the waste classification, in accordance with 10 CFR 61.55.

Description: At the end of 2007 and early 2008, the licensee conducted a campaign to ship low level radioactive waste to an authorized disposal site. As a result of several key personnel leaving the site, these shipments were also being used to train a new radwaste shipper. The licensee packaged and shipped containers (liners) of spent primary resins for disposal at a licensed disposal facility. For purposes of conformance and classification of the shipment relative to 10 CFR Part 61, the licensee classified the contents of the liners, as Class C shipments. This classification was based on a waste stream source term input into the RADMAN software application, which characterizes, classifies, manifests and documents packaged radioactive waste. However, the licensee used the waste stream source term radionuclide distribution for dry active waste, which was inappropriate for primary resin waste streams. This error was not

identified by the new prospective radwaste shipper (trainee), or by the individual conducting the evaluation of the trainee. Additionally, the licensee required all radwaste shipments to be independently verified by another radwaste shipper. This quality assurance review also failed to identify the error. Consequently, for shipments RWS-07-015 and RWS-07-016, the incorrect waste stream source terms were used to determine the concentrations of radionuclides, and ultimately the waste classification, in accordance with 10 CFR 61.55.

As part of its cause evaluation, the licensee re-evaluated these shipments using the appropriate waste stream radionuclide distribution and correctly determined that the waste classification remained Class C.

Analysis: This issue is not subject to traditional enforcement in that it did not have actual safety consequence, it was not an issue that had the potential to impact the NRC's ability to perform its regulatory function, and there were no willful aspects. The finding is more than minor because, if left uncorrected, the performance deficiency could have the potential to lead to a more significant safety concern. Specifically, an incorrect waste stream source term could misclassify radioactive waste shipments, and result in burial site license nonconformance.

The licensee re-calculated the classification of the shipment, using the correct waste stream radionuclide concentration, which confirmed that the original classification made with incorrect data was acceptable and indicated the shipment remained Class C. This finding in the area of 10 CFR Part 61 was evaluated against criteria specified in NRC Manual Chapter 0609, Appendix D, and was determined to be of very low safety-significance (Green). Specifically, no radiation limits were exceeded, there was no breach of packaging, there was no certificate of compliance finding, there was no low level burial ground non-conformance, and there was no failure to make notifications or provide emergency information.

As described above, the licensee experienced departure of key personnel from site. This created a situation where the trainer, evaluator, supervisor, and manager were all the same individual, and led to inadequate oversight of the shipment activities. Consequently, the inspectors determined that the cause of this finding was related to the cross-cutting area of Human Performance, Resources (H.2(b)) for insufficient number of qualified shipping personnel.

Enforcement: 10 CFR 61 requires, in part, a quality assurance program sufficient to assure compliance with 10 CFR Part 20, Appendix G, Section III.A.3. Contrary to the above, in late 2007 and early 2008, the licensee's 10 CFR Part 61 Quality Assurance Program was not adequate to identify incorrect waste stream data was used for purposes of waste classification in accordance with 10 CFR Part 61. This is an NRC-identified violation of 10 CFR 20, Appendix G, Section III.A.3. Because this matter was of very low safety-significance, and has been entered into the CAP (IR 950082), this violation is being treated as a NCV consistent with Section VI.A .1 of the NRC Enforcement Policy. (NCV 05000454/2009005-03; 05000455/2009005-03).

.2 Quarterly Resident Inspector Observations of Security Personnel and Activities

a. Inspection Scope

During the inspection period, the inspectors conducted observations of security force personnel and activities to ensure that the activities were consistent with licensee security procedures and regulatory requirements relating to nuclear plant security. These observations took place during both normal and off-normal plant working hours.

These quarterly resident inspector observations of security force personnel and activities did not constitute any additional inspection samples. Rather, they were considered an integral part of the inspectors' normal plant status review and inspection activities.

b. Findings

No findings of significance were identified.

.3 (Closed) Unresolved Item (URI 05000454/2009008-01; 05000455/2009008-01): Potential Failure of all EDGs for Both Units during a Loss of Offsite Power Event

On September 1, 2009, the NRC completed a baseline problem identification and resolution (PI&R) inspection at the Byron Nuclear Power Station (ML092880975). The inspectors identified an URI concerning the emergency DG jacket water (JW) system potential overcooling. Specifically, the inspectors noted that a loss of offsite power (LOOP) would result in a loss of instrument air (LOIA). The LOIA would cause the DG JW thermostatic control valve, DG5043, on each DG to fail open. This valve is designed to open in response to high intake air temperatures downstream of the turbocharger allowing a portion of the JW to flow into the cooler loop. Under normal operating conditions, this valve would be closed and the DG5045 valve would control the JW temperature by controlling the flow to the cooler loop. However, if the DG5043 valve fails open, then the cooler loop may experience an excessive flow resulting in lower JW temperatures. The inspectors were concerned that during these conditions, coupled with low service water temperatures, the operability of the DGs could be compromised. The inspectors identified this issue as an URI pending the licensee's submittal of an evaluation of the condition to the NRC for review to resolve this issue (URI 05000454/2009008-01; 05000455/2009008-01).

During this inspection, the inspectors reviewed drawings, design basis documents, procedures, vendor documents, and surveillance results associated with the JW cooling systems in addition to the licensee's evaluation of the concern. The inspectors considered the following modes of DG operation during their review: standby, startup, running in idle, and running at rated load.

- Standby Mode: During this mode of operation there is no flow through the cooler loop because the JW pump is not running and a check valve at the discharge side of the pump prevents back flow from the standby keep-warm system. This system connects downstream of the JW cooler loop and takes suction directly from the JW standpipe (i.e. reservoir). Therefore the standby keep-warm system flow bypasses the cooler loop.

- Startup Mode: The inspectors determined that the licensee's JW temperature acceptance criterion of 100°F was adequate. Specifically, (1) the station's TSs require the DGs to start and be ready to accept loads within ten seconds; and (2) a vendor specification stated that "In an emergency situation, the engine may be started and loaded below the alarm set point of 100°F. However, the starting time may exceed 10 seconds."

The inspectors noted that, although the licensee's evaluation established the acceptance criterion, it did not explicitly evaluate the startup mode of operation. However, the inspectors concluded that the acceptance criterion will not be challenged during startup at a service water temperature of 40°F, which is the lowest temperature of service water mentioned in the UFSAR. In summary, the JW temperature is not expected to be lower than the acceptance criterion because the bypass flow minimum temperature is expected to be 120°F and its volume is significantly greater than the cooler loop flow. This analysis conservatively assumes that the JW pump reaches full speed at time zero and, since the DG is assumed to be in standby mode for an extended period of time, gives no credit for DG-related heat loads transferred by the multiple heat exchangers in the flow path of the JW during the 10 second start.

- Idle Mode: The licensee established a JW temperature acceptance criterion of 32°F for this mode of operation using engineering judgment. The licensee concluded that the service water minimum temperature ensures that the JW will not freeze and judged that the JW temperature at the DG outlet will remain above 100°F. Although the 32°F temperature limit was questionable, the inspectors concluded the idle mode was bounded by the startup mode. Specifically, the idle mode is similar to the startup mode but with higher heat loads resulting in higher temperatures. In addition, the inspectors noted that the startup mode acceptance criterion is bounding because the vendor specification stated that the DG may be started and loaded below the alarm set point of 100°F if the 10 second start is not desired. Thus, if the DG can be successfully started within 10 seconds assuming a LOIA and low service water temperatures as discussed in the startup mode section, then the DG can run successfully in idle mode. In addition, a JW low temperature alarm would alert the operators when the temperature is below 105°F and the associated procedure will direct the operators to throttle open the JW cooler bypass valve.

The inspectors also reviewed surveillance results and noted that during idle operation of the DGs at relatively low service water temperatures, the lube oil temperature was maintained at relatively high temperatures when compared to the lube oil minimum temperature limit of 70°F.

- Rated Load Mode: The licensee concluded that the JW system would remain at or just below the normal temperature of 170°F with a failed open valve because the flow rate through valve DG5043 is limited by an orifice to a maximum of 250 gpm which is comparable to the normal DG5045 valve flow rate. The inspectors independently confirmed the licensee's conclusion that at rated load conditions the JW, lube oil, and intake manifold temperatures will be reduced, but not to unacceptable levels. The inspectors determined that the rated load mode was bounded by the startup and idle modes with respect to JW, lube oil, and intake manifold temperatures. Specifically, the rated load mode is similar to the startup and idle modes but with higher heat loads resulting in even higher temperatures.



Based on the above assessment, the inspectors determined that no performance deficiencies or violations of regulatory requirements existed. The inspectors had no further concerns in this area. The documents that were reviewed are included in the Attachment to this report. This URI is closed.

#### 4OA6 Management Meetings

##### .1 Exit Meeting Summary

On January 8, 2009, the inspectors presented the inspection results to Mr. D. Enright, and other members of the licensee staff. The licensee acknowledged the issues presented. The inspectors confirmed that none of the potential report input discussed was considered proprietary.

##### .2 Interim Exit Meetings

Interim exits were conducted for:

- Radiological Environmental Monitoring Program and closure of the transportation URI under the Public radiation Safety cornerstone with Mr. B. Adams and other members of the licensee's staff on November 20, 2009.
- The licensed operator requalification training program annual inspection results with Mr. R. Meyer of Operator Training on December 14, 2009, via telephone.
- The annual review of Emergency Action Level and Emergency Plan changes with the licensee's Emergency Preparedness Coordinator, Mr. R. Kartheiser, via telephone on December 21, 2009.
- The closure of URI 05000454/2009008-01; 05000455/2009008-01 with Regulatory Assurance Manager, Mr. D. Gudger and other members of the licensee's staff via telephone on January 11, 2010.

The inspectors confirmed that none of the potential report input discussed was considered proprietary. Proprietary material received during the inspection was returned to the licensee.

ATTACHMENT: SUPPLEMENTAL INFORMATION

## SUPPLEMENTAL INFORMATION

### KEY POINTS OF CONTACT

#### Licensee

D. Enright, Site Vice President  
B. Adams, Plant Manager  
D. Gudger, Regulatory Assurance Manager  
L. Bogue, Training Director  
B. Askren, Security Director  
C. Gayheart, Operations Director  
S. Kerr, Chemistry Manager  
B. Spar, Maintenance Director  
S. Greenlee, Engineering Director  
S. Briggs, Performance Improvement Manager

#### Nuclear Regulatory Commission

R. Skokowski, Chief, Branch 3, Division of Reactor Project, Region III

### LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

#### Opened

05000454/2009005-01 05000455/2009005-01	NCV	Failure to comply with 10 CFR Part 26.203(b)(2) (Section 1R20)
05000454/2009005-02 05000455/2009005-02	URI	Changes to EAL HU6 Potentially Decreased the Effectiveness of the Plans without Prior NRC Approval (Section 1EP4.1)
05000454/2009005-03 05000455/2009005-03	NCV	Failure to comply with 10 CFR Part 20 Appendix G. (Section 4OA5.1)

#### Closed

05000454/2009004-01 05000455/2009004-01	URI	Assigning appropriate 10 CFR Part 61 waste stream to radioactive waste shipments (Section 4OA5.1)
05000454/2009005-01 05000455/2009005-01	NCV	Failure to comply with 10 CFR Part 26.203(b)(2) (Section 1R20.1)
05000454/2009005-03 05000455/2009005-03	NCV	Failure to comply with 10 CFR Part 20 Appendix G (Section 4OA5.1)
05000454/2009008-01; 05000455/2009008-01	URI	Potential Failure of all EDGs for Both Units during a Loss of Offsite Power Event (Section 4OA5.3)

## **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.

### **Section 1R01: Adverse Weather Protection (Quarterly)**

IR 995110; Heater Coils are Too Dirty to Allow Air Flow, November 18, 2009  
IR 995111; Heater Coils are Too Dirty to Allow Air Flow, November 18, 2009  
IR 995115; Heater Coils are Too Dirty to Allow Air Flow, November 18, 2009  
IR 995117; Heater Fan will Not Run in Auto or In Manual, November 18, 2009  
IR 995122; Heater Fan Will Not Run in Auto or in Manual, November 18, 2009  
IR 995123; Heater Fan Will Not Run in Auto or in Manual, November 18, 2009  
IR 995125; Heater Fan Will Not Run in Auto or in Manual, November 18, 2009  
IR 995126; Heater Fan Will Not Run in Auto But Will Run in Manual, November 18, 2009  
IR 995129; Heater Fan Will Not Run in Auto But Will Run in Manual, November 18, 2009  
IR 995131; Heater Fan Will Not Run in Auto but Will Run in Manual, November 18, 2009  
IR 995134; Heater Works Fine – Cancel IR 995117  
IR 1004809; Heating Coils Leaks, December 13, 2009  
IR 1010134; Outside Louvers at C-7 on 401' Are Sticking Open, December 29, 2009  
WO 1168471 01; Freezing Temperature Protection – Auxiliary Steam Boiler Testing, December 14, 2009  
WO 1185023 01; Freezing Temperature Protection – NonProtected Area Buildings Ventilation, November 18, 2009  
WO 1185024 01; Freezing Temperature Protection – SH Area Heaters Testing, October 08, 2009  
WO 1185329 01; Freezing Temperature Protection – Plant Ventilation System, October 08, 2009  
WO 1196158 01; Freezing Temperature Protection – Protected Area Buildings Ventilation Systems and Tanks, December 01, 2009  
IR 651346; WR Needed Thermostat Damaged, July 18, 2009

### **Section 1R04: Equipment Alignment (Quarterly)**

Drawing M-66A; Composite Diagram of Component Cooling, Revision C  
BOP FW-300-1; Sampling Unit ½ Motor Driven Feedwater Pumps Lubricating Oil Reservoirs (FW01PA), Revision 4  
BOP FW-7; Startup of a Motor Driven Feedwater Pump, Revision 28  
BOP FW-M2I Main Feedwater System Valve Lineup, Revision 17  
BOP FW-E2; Unit 2 Feedwater System Electrical Lineup, Revision 5  
BOP SI-E1; Unit 1 Safety Injection System Electrical Lineup, Revision 7  
BOP SI-M1B; Unit 1 Train B Safety Injection System Valve Lineup, Revision 3

### **Section 1R05: Fire Protection (Quarterly)**

Fire Protection Report; Section 2.3.5.3, December 2008  
Fire Protection Report; Section 2.3.5.4, December 2008  
Fire Protection Report; Section 2.3.8.4, December 2008

Fire Protection Report; Section 2.3.11.61, December 2008  
Pre-Fire Plan; Auxiliary Building 426' Elevation – Laundry Room, Zone 11.6C-0, Revision 5  
Pre-Fire Plan; Fuel Handling Building 426' Elevation, Zone 12.1-0, Revision 6  
Pre-Fire Plan; Fuel Handling Building 401' Elevation, Zone 12.1-0, Revision 5  
Pre-Fire Plan; Auxiliary Building Ventilation Area, Elevation 451'-0", Zone 11.7-0, Rev. 5  
Pre-Fire Plan; Auxiliary Building Ventilation Area, Elevation 451'-0", Zone 11.7-2, Rev. 5  
Pre-Fire Plan; Unit 1 Cable Tunnel, Elevation 414'-0", Zone 3.1-1, Rev. 5  
Pre-Fire Plan; Unit 2 Cable Tunnel, Elevation 414'-0", Zone 3.1-2, Rev. 5  
Plan Barrier Impairment Permit 08-221, Door RS Train Shed to FHB, May 7, 2008  
Plant Barrier Impairment Permit 09-307, Door to Auxiliary Building Laundry Door,  
September 10, 2009  
IR 918403; FHB Train Shed Rails Allow Water Intrusion, May 11, 2009

#### Corrective Action Documents As a Result of NRC Inspection

IR 1010605; NRC Identified – CS IST Bases Documents Needs Update, December 29, 2009

#### **Section 1R05: Fire Protection (Annual)**

Fire Drill Scenario No. 09-06; Unit 1 Auxiliary Boiler Room Fire, October 28, 2009

#### **Section 1R06: Flood Protection Measures**

IR 869568; Inspect CW/M/U Line in SX M/U Instrument Vault, January 21, 2009  
IR 953598; 0SX138A Valve Vault Contained Standing Water, August 14, 2009  
IR 989409; Valve Vault for 0CW220 Contains Water, November 05, 2009  
IR 1009038; Adverse Trend in M-Rule for SX-5, December 23, 2009  
IR 1010179; OTDM 2009-10 Comp Actions Not in a Timely Manner, December 29, 2009  
WO 1094441 01; Remove Valve Pit Plug for 0SX138A and PP Water from Pit as Required,  
August 14, 2009  
Response to NRC Generic Letter 2007-01, "Inaccessible or Underground Power Cable Failures  
that Disable Accident Mitigation Systems or Cause Plant Transients", May 07, 2007  
Exelon Generation Company, LLC/AmerGen Energy Company, LLC Response to the Request  
for Additional Information (RAI) Regarding Resolution of NRC Generic Letter 2007-01,  
"Inaccessible or Underground Power Cable Failures that Disable Accident Mitigation Systems or  
Cause Plant Transients, December 07, 2007  
ER-AA-3003; Cable Condition Monitoring Program, Revision 0  
Condition Report 920055: Functional Failure of Flood Level Switch 2LS-WF021,  
December 03, 2009

#### **Section 1R11: Licensed Operator Requalification Program**

Requalification Examination Results/Calendar Year 2009

#### **Section 1R12: Maintenance Effectiveness**

IR 988535; 1B CV Pump Performance Issues, November 03, 2009  
IR 996491; Unit 1 RCS Leakrate Exceeds Action Level II, November 20, 2009  
IR 996757; 1CV007B Not Isolating When Closed, November 21, 2009  
IR 998767; 1A CV PP Barely keeps up with a 10 Gallon Boration, November 27, 2009

### **Section 1R13: Maintenance Risk Assessments and Emergent Work Control**

Schedule of Major Activities for Week December 14, 2009; Week A – A Train Work Week (B Train Protected)

Major Activities for Week: December 07, 2009, Week M – NON Train Work Week

Fragnet for 2A FW PP 2FW01PA, December 13, 2009

Fragnet for 2A RH PP 2RH01PA, December 14, 2009

Fragnet for 0A VC Chiller (126 hours of 30 days AOT)

Fragnet for 2A AF 0006A (11 and 3 hours of 72 hours AOT)

Fragnet for 2A CD/CB PP

IR 1005938; 1A Generator Stator Cooling Pump Failed to Start, December 15, 2009

IR 1006401; 2A Primary Containment Chiller High Particulates: Resample, December 16, 2009

IR 1006576; Evaluate 1B Charging Pump and System Response for OWA/OC,

December 17, 2009

IR 1008905; Online Risk Evaluation Did Not Include 0VA01CC Vent Fan, December 22, 2009

BY-CRM-013; Configuration Risk Management Assessment 1SX010 Unable to Close

### **Section 1R15: Operability Evaluations**

IR 1009151; SI Pump Discharge Pressure Rise to 655 PSIG over 2 Days, December 23, 2009

IR 1010682; DG Fuel Oil Storage TK Alarm Won't Clear, December 30, 2009

Adverse Condition Monitoring Plan: Elevated Unit 1 SI System Discharge Pressure, December 29, 2009

Analysis # DGD09301; Time Dependent Loading and Fuel Consumption for EDGs Following LOOP/LOCA, Revision 6B

Analysis # BYR-126; Diesel Oil Storage Tank Level Setpoints, Revision 2A

D0-SM-684; Diesel Oil Tank & Pump Sizing Confirmation, Revision 2

ANS-59.51, ANSI N195-1976; American National Standard Fuel Oil Systems for Standby Diesel Generators

Regulatory Guide 1.137; Fuel Oil Systems for Standby Diesel Generators, Revision 1

1BOSR 8.1.2-2; Unit 1B Diesel Generator Operability Surveillance, Revision 25

IR 988981; Potential Non-Conservative Do Tech Spec 3.8.3, November 04, 2009

### **Section 1R18: Plant Modifications**

Engineering Change 376449; Evaluate a Larger Fuse for the Control Transformer Primary circuit in MCC Cubicles with Size 3 Starters, October 16, 2009

Drawing 6E O-4030 W007; Schematic Diagram Control room Chilled Water Pumps OA & OB, OW001PA & OW001PB,

IR 926179; Byron Review of Braidwood IR 925143, May 29, 2009

### **Section 1R19: Post Maintenance Testing (Quarterly)**

2A SX Pump Performance Trend Data From 2007 & 2008

2BOL 7.8; LCOAR Essential Service Water (SX) System Tech Spec LCO 3.7.8, Revision 9

2BOSR 8.1.2-2; 2B Diesel Generator Operability Surveillance, Revision 20

WO 978387 01; 2SX01PA Group A IST Requirements for Essential Service Water, January 04, 2007

WO 1083466 01; 2SX01PA Group A IST Requirements for Essential Service Water, January 24, 2008

WO 1220466 13; CMO Vibration Test AF Pump/Gearbox, October 03, 2009  
WO 1285452 01; 2B Diesel Generator Operability Surveillance, December 04, 2009

### **Section 1R20: Refueling and Outage Activities (Quarterly)**

1BGP 100-1; Plant Heatup, Revision 48  
1BGP 100-1T3; Mode 4 to 3 Checklist, Revision 17  
1BGP 100-2A1; Reactor Startup, Revision 27  
1BGP 100-2T2; Mode 3 to 2 Checklist, Revision 19  
1BGP 100-3T2; Mode 2 to 1 checklist, Revision 16  
1BGP 100-7T3;; Calculation of Estimated Critical Condition Based on a Known Rod Position, Revision 13  
1BGP 100-7T4; Calculation of Estimated Critical Condition from Nuclear Fuels, Westinghouse or Beacon Supplied Valves, Revision 5  
Quick Human Performance Investigation Report; Chemistry Work Hour Rule Non-Compliances, October 15, 2009  
Action Tracking Item 977094; Common Cause Analysis on Work Hour Rule Issue Reports from B1R16, November 06, 2009  
IR 964499; Work Hour Rule Violation, September 14, 2009  
IR 966293; Non-Conservative Interpretation of Covered Work, September 17, 2009  
IR 972213' IMD Traveler Technician Violates 72 Hours in a 168 Hours Limit, September 29, 2009  
IR 973138; Work Hour Rule Violation Near-Miss – RP, September 30, 2009  
IR 974545; Work Hour Rules, October 04, 2009  
IR 975422; Work Hour Rule Violations – Operations, October 06, 2009  
IR 977094; Collective Review Needed of WHR IRS from B1R16, October 09, 2009  
IR 977320; Possible Work Hour Rule Violation, October 09, 2009  
IR 977868; Work Hour Rule Issue, October 12, 2009  
IR 978079; B1R16 Lessons Learned RP ESOM Logs, October 12, 2009  
LS-AA-119; Fatigue Management and Work Hour Limits, Revision 8  
LS-AA-119-1001; Fatigue Management, Revision 0  
LS-AA-119-1002; Scoping of Work Hour Limits, Revision 0  
LS-AA-125-1003; Quick Human Performance Investigation Report – Work Hour Rule Violations – Operations, October 05, 2009  
IR 973561; Work Hour Rule Procedural Violation, October 01, 2009

### **Corrective Action Documents As a Result of NRC Inspection**

IR 975227; Loose Sealtite on JCT Box 1JB886R in Containment, October 06, 2009  
IR 975485; NRC B1R16 Containment Closeout Walkdown, October 06, 2009

### **Section 1R22: Surveillance Testing (Quarterly)**

WO 1128019 01; Perform Automated Rod Drop Timing Test, October 07, 2009  
WO 1155283 01; Fire Protection Pump Flow and Pressure Test, October 07, 2009  
WO 1220884 01; N31/N35 Channel Operation Test, October 22, 2009  
WO 1255336 01; STT 2SX016B, 027B, 112B, 114B, 147B, 169B (WK C), November 20, 2009  
WO 1268116 01; Perform 2BOSR 5.5.8.CS.5-2C 2B DS Pump Comprehensive Test, October 02, 2009  
Byron Inservice Testing Bases Document IST-BYR-BDOC-V-06; 2BCS01PB Containment Spray Pump, Revision March 13, 2008

IST Requirements for Containment Spray Pump, December 02, 2009  
IR 940911; Unit 1 RCS Leakrate Exceeded STD Action Level II, July 11, 2009  
IR 943517; Unit 1 RCS Leakrate Exceeded STD Action Level II, July 19, 2009  
IR 948306; Unit 1 RCS Leakrate STD Action Level II Exceeded, July 31, 2009  
IR 978818; Dried Boric Acid on the 2A RH Mini Flow Transmitter Tubing, October 13, 2009  
IR 980951; Unit 1 RCDT Level Rising Faster Than Unit 2 RCDT, October 18, 2009  
IR 988535; 1B CV Pump Performance Issues, November 03, 2009  
IR 986171; 0B Diesel Fire Pump Flow Test, October 29, 2009  
IR 987417; Recent Change to 1/2BOSR 4.13.1-1 Poorly Implemented, November 01, 2009  
IR 987692; Abnormal Unit 1 VCT Level Trend – RCS Leakrate Impact, November 02, 2009  
IR 987695; Unit 1 VCT Level Trend Abnormal – Check 1CV8435 for Leakby,  
November 02, 2009  
IR 987698; Unit 1 VCT Level Trend Abnormal – Check 1CV8523B Leakby, November 02, 2009  
IR 987703; Unit 1 VCT Level Trend Abnormal – Check 1CV8523A Leakby, November 02, 2009  
IR 987706; Unit 1 VCT Level Trend Abnormal – Check 1CV8515 Leakby, November 02, 2009  
1BOSR 4.13.1-2; Unit 1 Reactor Coolant System Water Inventory Balance surveillance Manual  
Calculation, Revision 5  
Drawing CS-17; Containment Spray, Revision 3G  
Drawing M-518; Auxiliary Building, Process Pipe Sleeve and Sealing Schedule Elevation 364'-0,  
Revision AG  
Drawing M-21; Pipe Sleeve Penetration Details, Revision U  
Drawing M-2034; C&ID General Notes and Clarifying ???? Symbols, Revision F  
Drawing NP14-11; Detail M-3 and M-3B, Self-Supporting High Density Gel Typical Mechanical  
Penetration Seals, Revision 3  
Drawing 015; High Density Silicone for Fire/Air Seals of Multiple Pipe Mechanical Penetration –  
Wall or Floor, Revision 0  
Drawing 016; High Density Silicone for Fire/Air Seals of Multiple Pipe Mechanical Penetration –  
Wall or Floor, Revision 0

#### Corrective Action Documents As a Result of NRC Inspection

IR 1010605; Rain Water in FHB Train Rails, December 01, 2009

#### **Section 1EP4: Emergency Action Level and Emergency Plan Changes**

Byron Station Radiological Emergency Plan Annex, Revision 21, 22, 23, and 24

#### **Section 2PS3: Radiological Environmental Monitoring Program and Radioactive Material Control Program (71122.03)**

Check-In Self-Assessment Report; 940118; Radiological Environmental Monitoring Program;  
August 27, 2009

Check-In Self-Assessment Report; 842843-02; RP Radioactive Material (RAM) Control  
Check-In; August 12, 2009

Byron Nuclear Generating Stations; Annual Radiological Environmental Operating Report;  
May 2009

CY-BY-170-301; Offsite Dose Calculation Manual; Revision 6

CY-BY-170-3010; Offsite Dose Calculation Manual Supplemental Information; Revision 4

IR 832623; RAM Event – RW VR Control Room; October 18, 2008

IR 808787; Near Miss RAM Event; August 19, 2008

IR 809215; Radioactive Material Label Found on Ground; August 20, 2008

IR 617096; Orange Gripper Glove Found Outside Auxiliary Building; April 13, 2007  
IR 928415; 1st Quarter 2009 REMP TLD Anomalous Results; June 05, 2009  
Monthly Report on the Meteorological Monitoring Program at the Byron Nuclear Station;  
September 2009  
Sample Collection Data Sheet; REMP-1; October 07, 2009  
TLD Check Off Sheet; REMP-2-2; October 07, 2009  
Pump Field Check; REMP-3; October 07, 2009  
Sample Collection Data Sheet; REMP-1; November 05, 2009  
TLD Check Off Sheet; REMP-2-2; November 05, 2009  
Pump Field Check; REMP-3; November 05, 2009  
Field Rotometer Calibration; REMP-5; October 09, 2009  
Corporation Audit of Environmental, Inc. Midwest Laboratory – North Brook, IL; Audit  
Number SR 2008-039; October 10, 2008  
NUPIC Joint Audit of Teledyne Brown Engineering – Environmental Services; NUPIC Audit  
Number 20110; NUPIC Supplier No. 2427; October 29, 2008  
Teledyne Brown Engineering Environmental Services; 2008 Annual Quality Assurance Report;  
October 28, 2008  
RP-AA-14; Radioactive Material Control Program Description; Revision 0  
RP-AA-500; Radioactive Material (RAM) control; Revision 14  
RP-AA-503; Unconditional Release Method; Revision 17  
File 2.13.500.1; HpGe Calibrations for 2009/2010; May 28, 2009

#### **Section 4OA1: Performance Indicator Verification (71151)**

Selected Operations Logs; October 1, 2008, to September 30, 2009  
MSPI Data Acquisition Report; Emergency AC Power Function, October 2008 to  
September 2009  
MSPI Deviation Report; Emergency AC Power System, October 2008 to September 2009  
MSPI Deviation Report; High Pressure Injection System, April 1, 2009, to June 30, 2009  
MSPI Deviation Report; Heat Removal System, January 1, 2009, to March 31, 2009  
MSPI Deviation Report; Residual Heat Removal System, July 1, 2009, to September 30, 2009  
MSPI Deviation Report; Cooling Water Systems, April 1, 2009, to June 30, 2009

#### **Corrective Action Documents As a Result of NRC Inspection**

IR 1007941; TS Required Surveillance Not Logged, November 20, 2009

#### **Section 4OA2: Identification and Resolution of Problems (71152)**

OWA Board Meeting Minutes, Quarter 2, 2009, July 07, 2009  
OWA Board Meeting Minutes, Quarter 3, 2009, October 16, 2009  
List of Temporary Configuration Change Packages (TCCPs), November 19, 2009  
Byron Top Low-Margin Issues Quarter 4, 2009  
Operator Burden Aggregate Assessment Form, October 2009  
IR 1005938; 1A Stator Water Cooling (GC) Pump Failed to Start, December 16, 2009  
IR 1005896; Controller Does Not Appear to Work in Auto, December 15, 2009  
IR 1007157; RSH Auger Plugged and Tripping Breaker, December 18, 2009  
Corrective Action Documents As a Result of NRC Inspection  
IR 1000850; Potential Boric Acid Leaks W/1B RH Train Fill/Vent, December 02, 2009  
IR 1001003; Potential Boric Acid Leak, December 02, 2009



IR 1000842; NRC Plant Walkdown Identified House Keeping Issues – Area 5, December 03, 2009  
IR 974649; Differences in HU 100,000 Man Hour reports, October 04, 2009  
IR 1000850; NRC Identified Potential Boric Acid Leaks with 1B RH Train Fill/Vent, December 03, 2009  
IR 1001003; NRC Identified Potential Boric Acid Leak, December 03, 2009

**Section 40A5: Other Activities**

IR 950082; Incorrect Sample Was Used in RADMAN Calculation During Radioactive Waste Shipment; September 10, 2009  
Radioactive Waste Shipment; RWS 07-015; November 03, 2009  
Radioactive Waste Shipment; RWS 07-016; November 03, 2009  
IR 991553; Radwaste Shipping Documentation Review from CA No. 950082-57; November 10, 2009  
Analysis 3101-0036-01, MPR Evaluation of EDG Cooling With Jacket Water Valve DG5043 Failed Open; September 29, 2009.  
M-152; Diagram of Diesel Generator Jacket Water Schematic; April 5, 1990  
2PL07J-1-D2; Jacket Water Temperature Off Normal; December 16, 1998.  
BOP DG-11T2; Diesel Generator Operating Log, Revision 15.  
6G-98-0275; D/G Jacket Water Temperature Pneumatic Controller 50.59 Evaluation; December 29, 1998.  
IR 00958882; NRC concern – LOIA could affect DG JW temperatures; August 28, 2009  
BOP DG-11T2; Diesel Generator Operating Log – 1A DG results; January 18, 2009  
BOP DG-11T2; Diesel Generator Operating Log – 1B DG results; February 28, 2008.  
BOP DG-11T2; Diesel Generator Operating Log – 2A DG results; August 20, 2009.  
BOP DG-11T2; Diesel Generator Operating Log – 2B DG results; July 11, 2007.

## LIST OF ACRONYMS USED

ADAMS	Agencywide Document Access Management System
CAP	Corrective Action Program
CC	Component Cooling System
CFR	Code of Federal Regulations
DG	Diesel Generator (Emergency Diesel Generator)
EAL	Emergency Action Levels
HVAC	Heating, Ventilation, Air-Conditioning System
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Issue Report
JW	Jacket Water
LER	Licensee Event Report
LLD	Lower Limit of Detection
LOIA	Loss of Instrument Air
LOOP	Loss of Offsite Power
MSPI	Mitigating System Performance Index
NCV	Non-Cited Violation
NEI	Nuclear Energy Institute
NRC	U.S. Nuclear Regulatory Commission
ODCM	Offsite Dose Calculation Manual
OWA	Operator Workaround
PARS	Publicly Available Records
PI	Performance Indicator
PM	Post Maintenance
REMP	Radiological Environmental Monitoring Program
RFO	Refueling Outage
SDP	Significance Determination Process
TLD	Thermoluminescent Dosimeters
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS), 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  
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Letter to C. Pardee from R. Skokowski dated January 26, 2010.

SUBJECT: BYRON STATION, UNITS 1 AND 2, INTEGRATED INSPECTION  
REPORT 05000454/2009005; 05000455/2009005

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