



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

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

October 26, 2012

Mr. Michael J. Pacilio  
Senior Vice President, Exelon Generation Company, LLC  
President and Chief Nuclear Office (CNO), Exelon Nuclear  
4300 Warrenville Road  
Warrenville, IL 60555

SUBJECT: BYRON STATION, UNITS 1 AND 2, NRC INTEGRATED INSPECTION  
REPORT 05000454/2012004; 05000455/2012004

Dear Mr. Pacilio:

On September 30, 2012, 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 at an exit meeting on October 10, 2012, with Mr. T. Tulon and other members of your staff.

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

Based on the results of this inspection, no findings of significance were identified.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records System (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Website at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

*/RA/*

Eric R. Duncan, Chief  
Branch 3  
Division of Reactor Projects

Docket Nos. 50-454, 50-455, and 07200068  
License Nos. NPF-37 and NPF-66

Enclosure: Inspection Report No. 05000454/2012004; 05000455/2012004;  
w/Attachment: Supplemental Information

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U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos: 50-454; 50-455; and 07200068  
License Nos: NPF-37 and NPF-66

Report No: 05000454/2012004; 05000455/2012004

Licensee: Exelon Generation Company, LLC

Facility: Byron Station, Units 1 and 2

Location: Byron, IL

Dates: July 1, 2012, through September 30, 2012

Inspectors: B. Bartlett, Senior Resident Inspector  
J. Robbins, Resident Inspector  
A. Go, Senior Health Physicist  
E. Sanchez, Reactor Inspector  
C. Sanders, Reactor Operations Engineer  
A. Shaikh, Reactor Inspector  
C. St. Peters, Project Manager (NSPDP)  
M. Tobin, Reliability and Risk Engineer (NSPDP)  
C. Thompson, Resident Inspector, Illinois Emergency  
Management Agency

Approved by: E. Duncan, Chief  
Branch 3  
Division of Reactor Projects

Enclosure

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## SUMMARY OF FINDINGS

Inspection Report (IR) 05000454/2012004 and 05000455/2012004; 07/01/2012 - 09/30/2012; Byron Station, Units 1 & 2; Routine Integrated Inspection Report.

This report covers a 3-month period of inspection by resident inspectors and announced baseline inspections by regional inspectors. 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**

None.

**B. Licensee-Identified Violations**

None.

## REPORT DETAILS

### Summary of Plant Status

Unit 1 operated at less than full power for most of the inspection period. The unit was derated due to high circulating water temperatures as a result of the Unit 1 Natural Draft Cooling Tower (NDCT) being degraded. The unit was derated by as much as 38 percent and made frequent power level changes as outside air temperatures cycled. Unit 1 remained in this condition until September 10, 2012, when its eighteenth refueling outage was started. At the end of the inspection period the outage was still in progress.

Unit 2 operated at or near full power throughout most of the inspection period. During the hottest portion of the summer the unit was derated by as much as 23 percent due to degradation of the Unit 2 NDCT. With the cooler fall weather and the installation of 48 temporary Mechanical Draft Cooling Towers (MDCTs) the circulating water temperature was reduced enabling Unit 2 to return to full power.

### 1. REACTOR SAFETY

#### **Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity and Emergency Preparedness**

#### 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 Common Non-Essential Service Water;
- Unit 1 Train B Containment Spray;
- Unit 1 Reactor Containment Fan Coolers; and
- Unit 1 Train A Safety Injection.

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, the Updated Final Safety Analysis Report (UFSAR), Technical Specification (TS) requirements, outstanding work orders (WOs), 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 Corrective Action Program

(CAP) with the appropriate significance characterization. Documents reviewed are listed in the Attachment.

These activities constituted four partial system walkdown samples as defined in Inspection Procedure (IP) 71111.04-05.

b. Findings

No findings were identified.

.2 Semi-Annual Complete System Walkdown

a. Inspection Scope

During the week of September 10, 2012, the inspectors performed a complete system alignment inspection of the Unit 1 Residual Heat Removal system to verify the functional capability of the system. This system was selected because it was considered both safety significant and risk significant in the licensee's probabilistic risk assessment. In addition, a recent modification had been performed which affected certain important air operated valves in the system. The inspectors walked down the system to review mechanical and electrical equipment lineups; electrical power availability; system pressure and temperature indications, as appropriate; component labeling; component lubrication; component and equipment cooling; hangers and supports; operability of support systems; and to ensure that ancillary equipment or debris did not interfere with equipment operation. A review of a sample of past and outstanding WOs was performed to determine whether any deficiencies significantly affected the system function. In addition, the inspectors reviewed the CAP database to ensure that system equipment alignment problems were being identified and appropriately resolved. Documents reviewed are listed in the Attachment.

These activities constituted one complete system walkdown sample as defined in IP 71111.04-05.

b. Findings

No findings 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 2 Auxiliary Building General Area - 426' Elevation (Fire Zone 11.6-0);
- Circulating Water Pumphouse including Fire Pumps; and
- Unit 1 Train B Auxiliary Feedwater Pump Room (Fire Zone 11.4A-1).

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 to this report, the inspectors verified that fire hoses and extinguishers were in their designated locations and available for immediate use; that fire detectors and sprinklers were unobstructed; that transient material loading was within the analyzed limits; and 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.

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

b. Findings

No findings were identified

1R06 Flooding (71111.06)

.1 Internal Flooding

a. Inspection Scope

The inspectors reviewed selected risk important plant design features and licensee procedures intended to protect the plant and its safety-related equipment from internal flooding events. The inspectors reviewed flood analyses and design documents, including the UFSAR, engineering calculations, and abnormal operating procedures to identify licensee commitments. The specific documents reviewed are listed in the Attachment to this report. In addition, the inspectors reviewed licensee drawings to identify areas and equipment that may be affected by internal flooding caused by the failure or misalignment of nearby sources of water, such as the fire suppression or the circulating water systems. The inspectors also reviewed the licensee's corrective action documents with respect to past flood-related items identified in the CAP to verify the adequacy of the corrective actions. The inspectors performed a walkdown of the following plant areas to assess the adequacy of watertight doors and verify drains and sumps were clear of debris and were operable, and that the licensee complied with its commitments:

- Review of Temporary Water-Tight Door for Diesel Oil Storage Tank Rooms

This inspection constituted one internal flooding sample as defined in IP 71111.06-05.

b. Findings

No findings were identified.

1R08 Inservice Inspection Activities (71111.08)

From September 10, 2012 through September 21, 2012, the inspectors conducted a review of the implementation of the licensee's Inservice Inspection (ISI) Program for monitoring degradation of the Unit 1 reactor coolant system (RCS), steam generator (SG) tubes, emergency feedwater systems, risk-significant piping and components, and containment systems.

The reviews described in Sections 1R08.1, 1R08.2, 1R08.3, 1R08.4, and 1R08.5 below, constitute one inspection sample as described by IP 71111.08.

.1 Piping Systems Inservice Inspection Program

a. Inspection Scope

The inspectors observed and reviewed records of the following non-destructive examinations (NDE) required by the American Society of Mechanical Engineers (ASME) Section XI Code, and/or 10 CFR 50.55a to evaluate compliance with the ASME Code Section XI, and Section V requirements, and if any indications and defects were detected, to determine if these were dispositioned in accordance with the ASME Code or an NRC-approved alternative requirement:

- Ultrasonic Testing (UT) of Steam Generator Outlet Nozzle Inner Radius;
- UT of Steam Generator Inlet Nozzle Inner Radius;
- UT of 6-inch Diameter RCS Welds 1RC05AB-6 J02, J03, J04 and J05; and
- Liquid Penetrant (PT) Examination of Reactor Vessel Head Penetrations No. 43 and No. 31.

The inspectors also reviewed the following examinations from the previous outage with relevant/recordable indications.

- Reactor Vessel Head Penetration UT and PT Examinations

The inspectors reviewed records of the following risk-significant pressure boundary ASME Code Section XI Class 1 welds fabricated since the beginning of the last refueling outage to determine if the licensee followed the welding procedure, applied appropriate weld filler material, and implemented the applicable Section XI or Construction Code non-destructive examinations and acceptance criteria. Additionally, the inspectors reviewed the welding procedure specification and supporting weld procedure qualification records to determine if the weld procedure was qualified in accordance with the requirements of the Construction Code and the ASME Code Section IX.

- Class 1 chemical and volume control system check valve 1CV8377 replacement;
- Class 1 safety injection system check valve 1SI8900A replacement; and
- Class 1 chemical and volume control system 1CV15AB reroute.

b. Findings

No findings were identified.

.2 Reactor Pressure Vessel Upper Head Penetration Inspection Activities

a. Inspection Scope

For the Unit 1 reactor vessel head, a bare metal visual examination as well as non-visual examinations were required this outage pursuant to 10 CFR 50.55a(g)(6)(ii)(D).

The inspectors reviewed records of the visual examination conducted on the Unit 1 reactor vessel head to determine if the activities were conducted in accordance with the requirements of ASME Code Case N-729-1 and 10 CFR 50.55a(g)(6)(ii)(D). In particular, the inspectors confirmed that;

- the required visual examination scope/coverage was achieved and limitations (if applicable) were recorded in accordance with the licensee procedures;
- the licensee criteria for visual examination quality and instructions for resolving interference and masking issues were adequate; and
- if indications of potential through-wall leakage were identified, the licensee entered the condition into the CAP and implemented appropriate corrective actions.

The inspectors also observed the UT examination conducted on the Unit 1 reactor vessel head penetrations and the PT examinations conducted specifically on penetration 43 and 31 to determine if the activities were conducted in accordance with the requirements of ASME Code Case N-729-1 and 10 CFR 50.55a(g)(6)(ii)(D). In particular, the inspectors confirmed that:

- the required examination scope (volumetric and surface coverage) was achieved and limitations (if applicable) were recorded in accordance with the licensee procedures;
- the ultrasonic examination equipment and procedures used were demonstrated by blind demonstration testing;
- if indications or defects were identified, the licensee documented the conditions in examination reports and/or entered this condition into the CAP and implemented appropriate corrective actions, and
- if indications were accepted for continued service, the licensee evaluation and acceptance criteria were in accordance with the ASME Section XI Code, 10 CFR 50.55a(g)(6)(ii)(D) or an NRC-approved alternative.

b. Findings

No findings were identified.

### .3 Boric Acid Corrosion Control

#### a. Inspection Scope

The inspectors independently walked down the Unit 1 RCS loop piping, including the reactor coolant pumps, pressurizer and emergency core cooling systems within containment to identify boric acid leakage. The inspectors then reviewed the walk down performed by the licensee to ensure that components with boric acid deposits were identified and entered into the CAP. The inspectors observed these examinations to determine whether the licensee focused on locations where boric acid leaks could cause degradation of safety-related components.

The inspectors reviewed the following licensee evaluations of components with boric acid deposits to determine if the affected components were documented and properly evaluated in the CAP. Specifically, the inspectors evaluated the licensee's corrective actions to determine if degraded components met the component Construction Code and/or the ASME Section XI Code.

- BYR20115702; 1CV8396B Seal return filter outlet valve leaking;
- BYR20115947; 1SI085 Minor leakage with Unit 1 Train B Safety Injection pump running;
- BYR20116542; Small active body to bonnet boric acid leak on 1RY8000B;
- BYR20128823; Inactive boric acid leak on 1CV8151B; and
- BYR20116543; Unit 1 Loop D Reactor Coolant Pump leak from bowl flange near Component Cooling injection line.

The inspectors reviewed the following issue reports related to evidence of boric acid leakage to determine if the corrective actions completed were consistent with the requirements of the ASME Code Section XI and 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action."

- IR 1184315; Minor packing leak 1SI8816C;
- IR 1187034; Packing leak requires valve repacking 1PS9352D;
- IR 1187036; Heavy boric acid accumulation on 1RC8042A;
- IR 1187043; Minor pipe cap leak 1FT-0436; and
- IR 1206138; Minor boric acid accumulation on valve packing.

#### b. Findings

No findings were identified.

### .4 Steam Generator Tube Inspection Activities

#### a. Inspection Scope

For the Unit 1 SGs, no examination was required pursuant to the TSs during the current refueling outage. Therefore, no NRC review was completed for this inspection procedure attribute.

b. Findings

No findings were identified.

.5 Identification and Resolution of Problems

a. Inspection Scope

The inspectors performed a review of ISI/SG related problems entered into the licensee's CAP and conducted interviews with licensee staff to determine if:

- The licensee had established an appropriate threshold for identifying ISI/SG related problems;
- The licensee had performed a root cause (if applicable) and taken appropriate corrective actions; and
- The licensee had evaluated operating experience and industry generic issues related to ISI and pressure boundary integrity.

The inspectors performed these reviews to evaluate compliance with 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," requirements. The corrective action documents reviewed by the inspectors are listed in the Attachment to this report.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program (71111.11)

.1 Resident Inspector Quarterly Review (71111.11Q)

a. Inspection Scope

On August 21 and August 28, 2012, 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.

In addition, the inspectors observed licensed operator performance in the actual plant and the main control room during this calendar quarter.

This inspection constituted one quarterly licensed operator requalification program sample as defined in IP 71111.11-05.

b. Findings

No findings were identified.

.2 Resident Inspector Quarterly Observation of Heightened Activity or Risk (71111.11Q)

On September 9, 2012, the inspectors observed control room operators during the shutdown for Unit 1 Refueling Outage 18. This was an activity that required heightened awareness and was related to increased risk. 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 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 performance in these areas was compared to pre-established operator action expectations, procedural compliance, and task completion requirements. Documents reviewed are listed in the Attachment.

This inspection constituted one quarterly licensed operator heightened activity/risk sample as defined in IP 71111.11-05.

b. Findings

No findings 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 Abnormal Oil Analysis;
- Unit 1 Train B Residual Heat Removal Pump Failure to Start; and
- Unit 1 Train B Essential Service Water Pump Failure to Run.

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.

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

b. Findings

No findings 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:

- Shutdown Risk During Unit 1 Refueling Outage;
- Operational Risk to Unit 2 Following the Failure of the Unit 1 Train B Essential Service Water Pump to Run; and
- Operational Risk to Unit 1 During Main Steam Code Safety Valve Setpoint Testing.

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 three samples as defined in IP 71111.13-05.

b. Findings

No findings were identified.

1R15 Operability Evaluations (71111.15)

.1 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the following issues:

- As-Found Silt Levels in 0B River Screenhouse Intake Bay Outside of Acceptance Criteria;
- Main Steam Isolation Valve Accumulator Heat-up Concern Due to Postulated Steam Line Break; and
- Unit 2 Station Auxiliary Transformers 242-1 and 242-2.

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 sample 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.

This operability inspection constituted three samples as defined in IP 71111.15-05.

b. Findings

No findings were identified.

1R19 Post Maintenance Testing (71111.19)

.1 Post Maintenance Testing

a. Inspection Scope

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

- Unit 0 Train A Control Room Ventilation Damper 0VC033Y following Maintenance;
- Unit 1 Auxiliary Feedwater Valves 1AF005A thru 1AF005H following Modification;
- Unit 1 Train B Essential Service Water Pump following Electrical Repairs
- Unit 1 7300 Bypass Modification Post Maintenance Test (PMT) WO 1259697; and
- Unit 1 Integrated Emergency Core Core Cooling Test at the End of the Refueling Outage.

These activities were selected based upon the structure, system, and components (SSCs) 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 TSSs, 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.

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

b. Findings

No findings were identified.

1R20 Outage Activities (71111.20)

.1 Refueling Outage Activities

a. Inspection Scope

The inspectors reviewed the Outage Safety Plan (OSP) and contingency plans for the Unit 1 refueling outage (RFO) 18 which began on September 10, 2012, and was nearly completed at the end of the report period 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.

- Licensee configuration management, including maintenance of defense-in-depth commensurate with the OSP 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 OSP 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; and
- Licensee identification and resolution of problems related to RFO activities.

This inspection constituted one RFO sample as defined in IP 71111.20-05.

b. Findings

No findings were identified.

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:

- Trevitest of Main Steam Relief Valve 1MS016D;
- Unit 2 Reactor Coolant Pump Bus Undervoltage and Underfrequency Quarterly Surveillance;
- Unit 2 Train B Engineered Safety Feature Actuation System (ESFAS) Instrumentation Slave Relay Surveillance and Automatic Actuation Test;
- Unit 1 Train B Essential Service Water Pump Comprehensive IST Surveillance; and
- Unit 1 Auxiliary Feedwater Simultaneous Start of Both Pumps with Flow to the Steam Generators.

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 UFSAR, 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 IST activities, testing was performed in accordance with the applicable version of Section XI of the ASME 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 function; and
  - all problems identified during the testing were appropriately documented and dispositioned in the CAP.

Documents reviewed are listed in the Attachment.

This inspection constituted five routine surveillance testing samples as defined in IP 71111.22, Sections -02 and -05.

b. Findings

No findings were identified.

**Cornerstone: Emergency Preparedness**

1EP6 Drill Evaluation (71114.06)

.1 Emergency Preparedness Drill Observation

a. Inspection Scope

The inspectors evaluated the conduct of a routine licensee emergency drill on August 22, 2012, to identify any weaknesses and deficiencies in classification, notification, and protective action recommendation development activities. The inspectors observed emergency response operations in the simulator to determine whether the event classification, notifications, and protective action recommendations were performed in accordance with procedures. The inspectors also attended the licensee drill critique to compare any inspector-observed weakness with those identified by the licensee staff in order to evaluate the critique and to verify whether the licensee staff was properly identifying weaknesses and entering them into the CAP. As part of the inspection, the inspectors reviewed the drill package and other documents listed in the Attachment.

This emergency preparedness drill inspection constituted one sample as defined in IP 71114.06-05.

b. Findings

No findings were identified.

**2. RADIATION SAFETY**

2RS1 Radiological Hazard Assessment and Exposure Controls (71124.01)

The following inspection activities supplement those documented in Inspection Report 05000454/2012002; 05000455/2012002 and constitute one complete sample as defined in IP 71124.01-05.

.1 Inspection Planning (02.01)

a. Inspection Scope

The inspectors reviewed all licensee performance indicators for the Occupational Exposure Cornerstone for follow-up. The inspectors reviewed the results of radiation protection program audits (e.g., licensee's quality assurance audits or other independent audits). The inspectors reviewed any reports of operational occurrences related to occupational radiation safety since the last inspection. The inspectors reviewed the results of the audit and operational report reviews to gain insights into overall licensee performance.

b. Findings

No findings were identified.

.2 Radiological Hazard Assessment (02.02)

a. Inspection Scope

The inspectors determined if there have been changes to plant operations since the last inspection that may result in a significant new radiological hazard for onsite workers or members of the public. The inspectors evaluated whether the licensee assessed the potential impact of these changes and had implemented periodic monitoring, as appropriate, to detect and quantify the radiological hazard.

The inspectors reviewed the last two radiological surveys from selected plant areas and evaluated whether the thoroughness and frequency of the surveys were appropriate for the given radiological hazard.

The inspectors conducted walkdowns of the facility, including radioactive waste processing, storage, and handling areas to evaluate material condition and performed independent radiation measurements to verify radiological conditions.

b. Findings

No findings were identified.

.3 Instructions to Workers (02.03)

a. Inspection Scope

The inspectors reviewed the following radiation work permits (RWPs) used to access high radiation areas (HRAs) and evaluated the specified work control instructions or control barriers:

- Radiography Activities at Elevation 401 Boron Injection Tank Room;
- Reactor Head Disassembly and Reassembly Activities;
- Freeze Seal Activities; and
- Unit 1 Loop B Loop Stop Isolation Valve (LSIV) Repair Work.

For these RWPs, the inspectors assessed whether allowable stay times or permissible dose (including from the intake of radioactive material) for radiologically significant work under each RWP were clearly identified. The inspectors evaluated whether electronic personal dosimeter alarm setpoints were in conformance with survey indications and plant policy.

The inspectors reviewed selected occurrences where a worker's electronic personal dosimeter malfunctioned or alarmed. The inspectors evaluated whether workers responded appropriately to the off-normal condition. The inspectors assessed whether the issue was included in the CAP and dose evaluations were conducted as appropriate.

For work activities that could suddenly and severely increase radiological conditions, the inspectors assessed the licensee's means to inform workers of changes that could significantly impact their occupational dose.

b. Findings

No findings were identified.

.4 Contamination and Radioactive Material Control (02.04)

a. Inspection Scope

The inspectors observed locations where the licensee monitors potentially contaminated material leaving the radiological control 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 and evaluated whether the work was performed in accordance with plant procedures and whether the procedures were sufficient to control the spread of contamination and prevent unintended release of radioactive materials from the site. The inspectors assessed whether the radiation monitoring instrumentation had appropriate sensitivity for the types of radiation present.

The inspectors reviewed the licensee's criteria for the survey and release of potentially contaminated material. The inspectors evaluated whether there was guidance on how to respond to an alarm that indicated the presence of licensed radioactive material.

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. The inspectors assessed whether or not the licensee has established a de facto “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.

b. Findings

No findings were identified.

.5 Radiological Hazards Control and Work Coverage (02.05)

a. Inspection Scope

The inspectors evaluated ambient radiological conditions (e.g., radiation levels or potential radiation levels) during tours of the facility. The inspectors assessed whether the conditions were consistent with applicable posted surveys, RWPs, and worker briefings.

The inspectors evaluated the adequacy of radiological controls, such as required surveys, radiation protection job coverage (including audio and visual surveillance for remote job coverage), and contamination controls. The inspectors evaluated the licensee’s use of electronic personal dosimeters in high noise areas as HRA monitoring devices.

The inspectors assessed whether radiation monitoring devices were placed on the individual’s body consistent with licensee procedures. The inspectors assessed whether the dosimeter was placed in the location of highest expected dose or that the licensee properly employed an NRC-approved method of determining effective dose equivalent.

The inspectors reviewed the application of dosimetry to effectively monitor exposure to personnel in HRAs with significant dose rate gradients.

The inspectors reviewed the following RWPs for work within airborne radioactivity areas with the potential for individual worker internal exposures.

- Radiography Activities at Elevation 401 Boron Injection Tank Room;
- Reactor Head Disassembly and Reassembly Activities;
- Freeze Seal Activities; and
- Unit 1 Loop B LSIV Repair Work.

For these RWPs, the inspectors evaluated airborne radioactive controls and monitoring, including potential for significant airborne levels (e.g., grinding, grit blasting, system breaches, entry into tanks, cubicles, and reactor cavities). The inspectors assessed barrier (e.g., tent or glove box) integrity and temporary high-efficiency particulate air ventilation system operation.

The inspectors examined the licensee’s physical and programmatic controls for highly activated or contaminated materials (nonfuel) stored within spent fuel and other storage pools. The inspectors assessed whether appropriate controls (i.e., administrative and physical controls) were in place to preclude inadvertent removal of these materials from the pool.

b. Findings

No findings were identified.

.6 Risk-Significant High Radiation Area and Very High Radiation Area Controls (02.06)

a. Inspection Scope

The inspectors evaluated licensee controls for very high radiation areas (VHRAs) and areas with the potential to become a VHRA to ensure that an individual was not able to gain unauthorized access to the VHRA.

b. Findings

No findings were identified.

.7 Radiation Worker Performance (02.07)

a. Inspection Scope

The inspectors reviewed radiological problem reports since the last inspection that found the cause of the event to be human performance errors. The inspectors evaluated whether there was an observable pattern traceable to a similar cause. The inspectors assessed whether this perspective matched the corrective action approach taken by the licensee to resolve the reported problems. The inspectors discussed with the radiation protection manager any problems with the corrective actions planned or taken.

b. Findings

No findings were identified.

.8 Radiation Protection Technician Proficiency (02.08)

a. Inspection Scope

The inspectors reviewed radiological problem reports since the last inspection that found the cause of the event to be radiation protection technician error. The inspectors evaluated whether there was an observable pattern traceable to a similar cause. The inspectors assessed whether this perspective matched the corrective action approach taken by the licensee to resolve the reported problems.

b. Findings

No findings were identified.

.9 Problem Identification and Resolution (02.09)

a. Inspection Scope

The inspectors evaluated whether problems associated with radiation monitoring and exposure controls were being identified by the licensee at an appropriate threshold and were properly addressed for resolution in the licensee's CAP. The inspectors assessed the appropriateness of the corrective actions for a selected sample of problems

documented by the licensee that involved radiation monitoring and exposure controls. The inspectors assessed the licensee's process for applying operating experience to their plant.

b. Findings

No findings were identified.

2RS2 Occupational As-Low-As-Is-Reasonably-Achievable Planning and Controls (71124.02)

The following inspection activities supplement those documented in Inspection Report 05000454/2012002; 05000455/2012002 and constitute a partial sample as defined in IP 71124.02-05.

.1 Inspection Planning (02.01)

a. Inspection Scope

The inspectors reviewed pertinent information regarding plant collective exposure history, current exposure trends, and ongoing or planned activities in order to assess current performance and exposure challenges. The inspectors reviewed the plant's three-year rolling average collective exposure.

The inspectors reviewed the site-specific trends in collective exposures (using NUREG-0713, "Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities," and plant historical data) and source term (average contact dose rate with reactor coolant piping) measurements.

The inspectors reviewed site-specific procedures associated with maintaining occupational exposures as-low-as-is-reasonably-achievable (ALARA), which included a review of processes used to estimate and track exposures from specific work activities.

b. Findings

No findings were identified.

.2 Radiological Work Planning (02.02)

a. Inspection Scope

The inspectors selected the following work activities of the highest exposure significance:

- Reactor Head Disassembly and Reassembly Activities;
- Freeze Seal Activities; and
- 1B LSIV Repair Work.

The inspectors reviewed the ALARA work activity evaluations, exposure estimates, and exposure mitigation requirements. The inspectors determined whether the licensee

reasonably grouped the radiological work into work activities, based on historical precedence, industry norms, and/or special circumstances.

The inspectors assessed whether the licensee's planning identified appropriate dose mitigation features; considered alternate mitigation features; and defined reasonable dose goals. The inspectors evaluated whether the licensee's ALARA assessment had taken into account decreased worker efficiency from use of respiratory protective devices and/or heat stress mitigation equipment (e.g., ice vests). The inspectors determined whether the licensee's work planning considered the use of remote technologies (e.g., teledosimetry, remote visual monitoring, and robotics) as a means to reduce dose and the use of dose reduction insights from industry operating experience and plant-specific lessons learned. The inspectors assessed the integration of ALARA requirements into work procedure and radiation work permit documents.

The inspectors determined whether post-job reviews were conducted and if identified problems were entered into the licensee's corrective action program.

b. Findings

No findings were identified.

**4. OTHER ACTIVITIES**

40A1 Performance Indicator Verification (71151)

.1 Occupational Exposure Control Effectiveness

a. Inspection Scope

The inspectors sampled licensee submittals for the Occupational Radiological Occurrences Performance Indicator (PI) for the period from the first quarter 2011 through the first quarter 2012. The inspectors used PI definitions and guidance contained in Nuclear Energy Institute (NEI) 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, dated October 2009, to determine the accuracy of the PI data reported during those periods. The inspectors reviewed the licensee's assessment of the PI for occupational radiation safety to determine if indicator-related data was adequately assessed and reported. To assess the adequacy of the licensee's PI data collection and analyses, the inspectors discussed with radiation protection staff the scope and breadth of its data review and the results of those reviews. The inspectors independently reviewed electronic personal dosimetry dose rate and accumulated dose alarms and dose reports and the dose assignments for any intakes that occurred during the time period reviewed to determine if there were potentially unrecognized occurrences. The inspectors also conducted walkdowns of numerous locked high and VHRA entrances to determine the adequacy of the controls in place for these areas. Documents reviewed are listed in the Attachment.

This inspection constituted one Occupational Exposure Control Effectiveness sample as defined in IP 71151-05.

b. Findings

No findings were identified.

.2 Radiological Effluent Technical Specification/Offsite Dose Calculation Manual  
Radiological Effluent Occurrences

a. Inspection Scope

The inspectors sampled licensee submittals for the Radiological Effluent TS (RETS)/ Offsite Dose Calculation Manual (ODCM) Radiological Effluent Occurrences PI for the period from the first quarter 2011 through the first quarter 2012. The inspectors used PI definitions and guidance contained in NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, dated October 2009, to determine the accuracy of the PI data reported during those periods. The inspectors reviewed the licensee's issue report database and selected individual reports generated since this indicator was last reviewed to identify any potential occurrences such as unmonitored, uncontrolled, or improperly calculated effluent releases that may have impacted offsite dose. The inspectors reviewed gaseous effluent summary data and the results of associated offsite dose calculations for selected dates to determine if indicator results were accurately reported. The inspectors also reviewed the licensee's methods for quantifying gaseous and liquid effluents and determining effluent dose. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one RETS/ODCM Radiological Effluent Occurrences sample as defined in IP 71151 05.

b. Findings

No findings were identified.

40A2 Identification and Resolution of Problems (71152)

.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 occurrence 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 were identified.

.2 Selected Issue Follow-Up Inspection

a. Inspection Scope

During a review of items entered in the licensee's CAP, the inspectors recognized a corrective action item documenting a potential issue with the mounting methods associated with the air supply tubing for safety-related components. This item was selected due to its potential to impact equipment operability. Additionally, the inspectors recognized a corrective action item documenting operating experience from another licensee facility regarding Spent Fuel Pool Boral Coupon Testing. Specifically, the inspectors focused on the surveillance frequency. The following items were specifically reviewed:

- Clamping Methods Used in Air Supply Piping to Safety-Related Components; and
- Spent Fuel Pool Coupon Testing.

This review constituted two in-depth problem identification and resolution samples as defined in IP 71152-05.

b. Findings

No findings were identified.

.3 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 were identified.

.4 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 4OA2.3 above, licensee trending efforts, and licensee human performance results. The inspectors' review nominally considered the 6 month period of July 1 through March 31, 2012, although some examples expanded beyond those dates where the scope of the trend warranted it.

As part of this inspection, the inspectors also reviewed issues that could be documented outside the normal CAP such as in 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.

b. Findings

No findings were identified.

4OA5 Other Activities

.1 Correction to Byron Station, Units 1 and 2 Component Design Bases Inspection Report 05000454/2012007; 05000455/2012007(DRS)

In the second paragraph of the Enforcement section for the Finding on page 12 of the Component Design Bases (CDBI) inspection report, an incorrect docket and report numbers were referenced. The corrected version of that paragraph is included here with the revised numbers italicized.

Contrary to the above, from initial construction until May 18, 2012, the design basis minimum pickup voltage was not specified in purchase order specifications and no testing had been performed to verify the minimum pickup voltage for the installed safety-related motor-control contactors. Because this violation was of very low safety significance and was entered into the licensee's corrective action program as Issue Report (IR) 1368220 and IR 1376793, this violation is being treated as a Non-Cited Violation (NCV), consistent with Section 2.3.2 of the NRC Enforcement Policy (NCV *5000454/2012007-01; 5000455/2012007-01*, Non-Conforming 480/120 Vac Motor Control Contactors).

4OA6 Management Meetings

.1 Exit Meeting Summary

On October 10, 2012, the inspectors presented the inspection results to Mr. T. Tulon, 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

On September 21, 2012, the results of the Inservice Inspection with Site Vice President Mr. T. Tulon and other members of the licensee staff. Licensee personnel acknowledged the issues presented. 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.

On September 24, 2012, the results of the Radiological Hazard Assessment and Exposure Controls; Occupational ALARA Planning and Controls; and Occupational Exposure Control Effectiveness and RETS/ODCM Radiological Effluent Occurrences Performance Indicator Verification with Site Vice President Mr. T. Tulon, and other members of the licensee staff. 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

B. Youman, Plant Manager  
G. Contrady, Programs Manager  
D. Gudger, Regulatory Assurance Manager  
J. Langan, Regulatory Assurance Licensing Engineer  
B. Spahr, Maintenance Director  
D. Drawbaugh, Emergency Preparedness Manager  
B. Kartheiser, Emergency Preparedness Coordinator  
S. Kerr, Work Management Manager  
B. McBride, ISI Program Engineer  
D. Spitzer, Regulatory Assurance  
T. Eliakis, ISFSI Project Manager  
T. Hulbert, Regulatory Assurance Assistant  
S. Briggs, Operations Director

#### Nuclear Regulatory Commission

E. Duncan, Chief, Branch 3, Division of Reactor Projects  
B. Bartlett, Byron Senior Resident Inspector  
J. Robbins, Byron Resident Inspector

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

#### Opened

None.

#### Closed

None.

#### Discussed

None.

## LIST OF DOCUMENTS REVIEWED

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

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

- Pre-Fire Plan; Fire Zone 11.6-0, Auxiliary Building Elevation 426'-0" General Area – West, Rev. 1
- Pre-Fire Plan; Fire Zone 11.6-0, Auxiliary Building Elevation 426'-0" General Area – North, Rev. 3
- Pre-Fire Plan; Fire Zone 11.6-0, Auxiliary Building Elevation 426'-0" General Area – South, Rev. 2
- Byron Station IPEEE Submittal Report; December 1996
- 11.6-0 Auxiliary Building Elevation 426'-0"; Figure 2.3-10 through 2.3-26
- Fire Protection Report; Figure 2.3-10
- Fire Protection Report; Figure 2.3-22
- Fire Protection Report; Figure 2.3-25
- Fire Protection Report; Figure 2.3-26

### **Section 1R06: Flooding**

- MA-BY-MM-4-DS901; Installation and Removal of Water-Tight Door Temporary Flood Barrier, Revision 3
- IR 1409309; Safety-Related Cable Vault 1M1G(1G1) Inspection – Repairs, September 5, 2012

### **Section 1R08: Inservice Inspection Activities**

- WO 01408987; Determine Unit 1 EDY and Determine Unit 1 RIY; August 9, 2012
- WO 1266754-10 MM 1CV8377 Replace Valve; August 19, 2010
- WO 1347300 Replace Check Valve 1SI8900A; June 14, 2011
- WO1382922-34 Modify Seal Injection Line 1CV15AB; June 27, 2011
- WO 1419413 Repair RPV Indications at Spare Penetration #64; March 29, 2011
- WO 1435830; Reactor Pressure Vessel Head Bare Metal Examination; September 10, 2012
- WDI-STD-1040; Wesdyne Procedure for Ultrasonic Examination of Reactor Vessel Head Penetrations; Revision 8
- WDI-STD-1041; Wesdyne Procedure for Reactor Vessel Head Penetration Ultrasonic Examination Analysis; Revision 7
- WDI-STD-101; RVHI Vent Tube J-Weld Eddy Current Examination; Revision 0
- IR 1201675; CRDM Liquid Penetrant Inspection Miscommunication on Requirements; April 12, 2011
- ER-AA-330-002; Inservice Inspection of Section XI Welds and Components; Revision 10
- ER-AA-335-015; VT-2 Visual Examination; Revision 11
- ER-AP-331-1001; Boric Acid Corrosion Control (BACC) Inspection Locations, Implementation and Inspection Guidelines; Revision 6
- ER-AP-331-1002; Boric Acid Corrosion Control Program Identification Screening and Evaluation; Revision 7
- ER-AP-331; Boric Acid Corrosion Control (BACC) Program; Revision 6

- IR 12228940; Snubber 1RY06124S Removed Without Proper Documentation B1R17; June 14, 2011
- IR 1192603; Recordable Indication Found On Unit 1A RHR Pump Lug; March 26, 2011
- IR 01192429; B1R17-NDE (VT-1) Of 1B RCP Flange Face Reveals Damage; March 25, 2011
- IR 1413373; WIP Written For 10014308 RX Head PT Test; September 14, 2012
- IR 1375096; NRC 1Q2012 Green NCV Incomplete CCW and SX Code Examination; June 6, 2012
- IR 1268691; B2R16 Can't Perform Section XI UT for Line 2SI08CB weld 1; September 27, 2011
- IR 1197320; Missed VT-3 Examination of Emergency Hatch Shaft Sealing Surface; April 4, 2011
- IR 1187189; 1CV8396B Seal Return Filter Outlet Valve Leaking; March 14, 2011
- IR 1416479; Typo Error on ISI Isometric Drawing; September 21, 2012
- IR 1416150; NRC ISI Observation Welding B1R18 – WPS 8-8GTSM Rev. 2; September 20, 2012
- IR 1184315; Minor Packing Leak 1SI8816C; March 7, 2011
- IR 1206496; 1D RCP Leak From Bowl Flange Near CC Injection Line; April 22, 2011
- IR 1206138; Minor Boric Acid Accumulation on Valve Packing; April 22, 2011
- IR 1187043; Minor Pipe Cap Leak 1FT-0436; March 14, 2011
- IR 1187036; Heavy Boric Acid Accumulation on 1RC8042A; March 14, 2011
- IR 1187034; Packing Leak, Requires Valve Repacking – 1PS9352D; March 14, 2011
- IR 1184315; Minor Packing Leak 1SI8816C; March 7, 2011
- BYR20116543; 1D RCP Leak From Bowl Flange Near CC Injection Line; May 22, 2011
- BYR20115702; 1CV8396B Seal Return Filter Outlet Valve Leaking; March 19, 2011
- BYR20115947; 1SI085 Minor Leakage with 1B SI Pump Running; April 2, 2011
- BYR20116542; Small Active Body to Bonnet Boric Acid Leak on 1RY8000B; April 22, 2011
- BYR20128823; Inactive Boric Acid Leak on 1CV8151B; January 11, 2012
- Report B1R18-UT-027; Ultrasonic Examination Data Sheet for 1RC05AB-06/J03; September 17, 2012
- Report B1R18-UT-028; Ultrasonic Examination Data Sheet for 1RC05AB-06/J04; September 17, 2012
- Report B1R18-UT-029; Ultrasonic Examination Data Sheet for 1RC05AB-6/J05; September 17, 2012
- Report B1R18-UT-030; Ultrasonic Examination Data Sheet for 1RC05AB-6/J02; September 17, 2012
- Report B1R18-UT-041; Ultrasonic Examination Data Sheet for 1RC-01-BD/N-1-NIR/SG; September 20, 2012
- Report B1R18-UT-042; Ultrasonic Examination Data Sheet for 1RC-01-BD/N-2-NIR/SG; September 20, 2012
- Report B1R17-VT-001; Visual Examination Data Sheet for 1RH-01-PA/RHP E-3; March 20, 2011
- Report B1R17-PT-001; Liquid Penetrant Examination Data Sheet for 1RH-01-PA/RHP E-3; March 20, 2011
- Report 903963-002; RX Head Penetration #43 Liquid Penetrant Examination; September 20, 2012
- Report 903963-001; RX Head Penetration #31 Liquid Penetrant Examination; September 20, 2012
- Report 903963-003; RX Head Penetration #31 Liquid Penetrant Examination; September 21, 2012
- UT Data File Name CAE-R18-CP02-43-01; RX Head Penetration #43 UT Examination Data Sheet; September 15, 2012

- UT Data File Name CAE-R18-CP02-REPAIR-43-01; RX Head Penetration #43 UT Examination Data Sheet; September 21, 2012
- UT Data File Name CAE-R18-CP02-31-01; RX Head Penetration #43 UT Examination Data Sheet; September 15, 2012
- UT Data File Name CAE-R18-CP02-REPAIR-31-01/02/03/04; RX Head Penetration #31 UT Examination Data Sheet; September 21, 2012
- UT Data File Name CAE-R18-CP02-OH01-64-01/02; RX Head Penetration #64 UT Examination Data Sheet; September 14, 2012
- UT Data File Name CAE-R18-CP02-OH01-76-01/02/03; RX Head Penetration #76 UT Examination Data Sheet; September 15, 2012
- WPS 8-8-GTSM; ASME Welding Procedure Specification Record; Revision 2
- PQR 1-51A; Procedure Qualification Record; December 28, 1983
- PQR 4-51A; Procedure Qualification Record; September 12, 1986
- PQR A-003; Procedure Qualification Record; February 8, 2000
- PQR A-004; Procedure Qualification record; February 8, 2000

### **Section 1R12: Maintenance Effectiveness (Quarterly)**

- IR 1418471; Abnormal Oil Analysis Result on 1B CV Motor Outboard Bearing, September 26, 2012
- IR 1402510; 0SX163D – Rebuild/Replace HBC, August 17, 2012
- System Health Report, Essential Service Water, last updated June 30, 2012
- System Health Report ,Residual Heat Removal, last updated June 30, 2012

### **Section 1R15: Operability Evaluations (Quarterly)**

- OpEval 12-007; MSIV Accumulator Heatup Concern, Rev. 0
- IR 1409899; Temperature Effects on MSIV Hydraulics, September 6, 2012
- IR 1320352; B2F26 242-1 Oil Sample Results – Increased Combustible Gases, January 12, 2012
- IR 1320353; B2F26 242-1 Oil Sample Results – Increased Combustible Gases, January 12, 2012
- IR 1322896; Concerns with Operability Evaluation, February 4, 2012
- IR 1332352; Received Unexpected Annunciator – 242-2 Trouble, February 26, 2012
- IR 1337328; Gas Sample Requires Additional Investigation – SAT 242-2, March, 6, 2012
- IR 1342343; SAT 242-1 Trouble Alarm, March 18, 2012
- IR 1363005; SAT 242-1 Trouble Alarm, May 5, 2012
- IR 1381241; Unexpected Alarm SAT 242-2, June 23, 2012
- IR 1389572; Prism System Detected an Alarm for the SAT 242-1 H Winding Temperature, July 17, 2012

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

- IR 1414688; 1B SX PP Tripped Unexpectedly, September 18, 2012
- WO 01574671-2; 1B SX PP Tripped Unexpectedly, September 24, 2012
- BOP SX-1; Essential Service Water Pump Startup, Rev. 22
- BOP SX-2; Essential Service Water Pump Shutdown, Rev. 13
- Unit 1, System Health Report for Essential Service Water, updated June 30, 2012
- IR 1404953; Possible Thread Sealant Contamination Inside I/P Converter, August 25, 2012
- IR 1405030; 1AF005E Travel Found Out of Tolerance, August 25, 2012
- IR 1405884; Background IR for Extent of Condition, August 25, 2012

- IR 1409940; 1AF005B-D Did Not Show Full Closed Via Limit Switches, September 7, 2012
- 1BOSR PL-R2-AF.3; Remote Shutdown Panel Control Switch Functional Check, Rev. 0
- IR 1405697; 0VC033Y Damper Failed to Close (0A VC TRN Discharge Damper), August 27, 2012
- BOP VC-17; Swapping Control Room Chiller and HVAC Trains, Rev. 6

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

- IR 1413704; R2 1RC01BB-URL Belly Band Shim Packs Damaged, September 15, 2012
- IR 1413804; Change PTO to Complete 24Y PM# 103868-26, September 16, 2012
- IR 1413806; Supplemental Fuel Inspection Required Due to Overload, September 14, 2012
- IR 1413815; Concerns with Corrosion in 1D Outlet Waterbox, September 16, 2012
- IR 1413827; Weld Preps Performed on Incorrect RCFC Cooler Head, September 16, 2012
- IR 1413872; Part 21 – Potential Defect on Ametek Part 03-040060-00, September 15, 2012
- IR 1414142; 1AF013C Circuit Resistance Test-Mod Discrepancy, September 17, 2012
- IR 1414513; As-Found Dimensions Found to Be Out of Design Tolerance, September 18, 2012
- IR 1414514; As-Found Dimensions Found to Be Out of Design Tolerance, September 18, 2012
- IR 1415929; Valve Leaks By Internally When Closed, September September 16, 2012
- IR 1416374; 11A066 Failed Post Maintenance Stroke Time Test, September 21, 2012
- IR 1416386; 1RC01BA-URL Belly Band Shim Packs Damaged, September 21, 2012
- IR 1416405; 1RC01BC-URL Belly Band Shim Packs Damaged, September 21, 2012
- IR 1416411; 1RC01BD-URL Belly Band Shim Packs Damaged, September 21, 2012
- IR 1417399; 1D RCP Upper Oil Level Alarm Switch Issues, September 24, 2012
- IR 1417844; 1C RCP Motor Bracket Insulation Resistance Reading is Low, September 24, 2012
- IR1417983; Stop Collar for PORV Trim Replacement Smaller than Yoke Bore, September 25, 2012
- IR 1418182; Pipe Hanger As-Found Configuration Does Not Match Drawing, September 25, 2012
- IR 1418223; B1R18 LL Bolt Dropped in Reactor Cavity, September 25, 2012
- IR 1419779; Fall Protection Lanyard Improperly Attached, September 28, 2012
- IR 1419802; DRPI Testing Value Criteria Not Met, September 28, 2012
- IR 1419850; 1CV459 Stroking Too Fast – Outside of IST Administrative Limit, September 28, 2012
- IR 1421286; 1A DG Vent Fan Did Not Restart During 1A DG Testing, October 2, 2012
- OU-AP-104; Shutdown Safety Management Program Byron/Braidwood Annex, Revision 17

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

- IR 1417541; NRC Identified Loose Condulette Cover, September 24, 2012
- IR 1419168; B1R18 NRC Identified ECCS Sump FME Cover Issue - Repeat Issue, September 27, 2012

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

- 2BOSR 3.1.9-1; Unit 2 Reactor Coolant Pump Bus Underfrequency Quarterly Surveillance, Rev. 2
- 2BOSR 3.1.9-2; Unit 2 Reactor Coolant Pump Bus Undervoltage Quarterly Surveillance, Rev. 1

- 2BOL 3.1; Reactor Trip System Instrumentation Technical Specification LCO 3.3.1, Rev. 10
- 1BOSR 5.5.8.SX.5-2c; Unit One Comprehensive Inservice Testing Requirements for the Essential Service Water Pump 1SX01PB and Unit 1 SX Pumps Discharge Check Valves, Rev. 4
- Unit 1, System Health Report for Essential Service Water, updated March 31, 2012
- 2BOSR 3.2.8-610B; Unit 2 ESFAS Instrumentation Slave Relay Surveillance and Automatic Actuation Test, Rev. 3
- 2BOSR 0.5-3.SX.1-2; Unit Two Test of the 2B Essential Service Water Miscellaneous System Valve, Rev. 5
- 1BOSR 5.5.8.AF.5-1c; Unit 1 Comprehensive Inservice Testing Requirements for the Diesel Driven Auxiliary Feedwater Pump 1AF01PA, Rev. 5
- 1BOSR AF-3; Unit One Simultaneous Start of Both AF Pumps with Flow to the Steam Generators, Rev. 0
- 1BOSR 5.5.8.AF.5-2c; Unit 1 Comprehensive Inservice Testing Requirements for the Diesel Driven Auxiliary Feedwater Pump 1AF01PB, Rev. 6

### **Section 2RS1: Radiological Hazard Assessment and Exposure Controls**

- RP-AA-870-1002; Use of Vacuum Cleaners in Radiologically Controlled Areas; Revision 3
- RP-AA-460; Controls for High and Locked High Radiation Areas; Revision 21
- RP-AA-460-002; Additional High Radiation Exposure Control; Revision 0
- RP-AA-460-003; Access to HRAS/LHRAS/VHRAS in Response to a Potential or Actual Emergency; Revision 2
- RP-AA-210; Dosimetry Issue, Usage and Control; Revision 21
- RP-AA-441; Evaluation and Selection Process for Radiological Respirator Use; Revision 4
- RP-AA-462; Control for Radiographic Operations; Revision 7
- Docket No. 030-35252; License No. 42-32219-01; Team Industrial Services, Inc., Alvin, Texas (Radiography License); June 14, 2012
- RWP-10013796; Radiography Activities at Bit Room; Revision 0
- ALARA-10013796; B1R18 Radiography and All Associated Activities; Revision 15
- QSA Global Source Certificate No. 87613, Ir-192 (Radiography Sealed Source); August 28, 2012
- RWP-10014310; 1B LSIV (1RC8002B) Repair Work: All Activities; Revision 0
- RWP-10014311; Interference, Insulation and Supporting Activities; Revision 0
- RWP-10014313; 1BLSIV Scaffold Activities; Revision 0
- RWP-10014308; IRC 8042C Freeze Seal; Revision 0
- RWP-10013772; B1R18 Emergent Reactor Head Repairs of Penetrations; Revision 0
- IR 1395986; RP Technician Did Not Meet Smear Sample Expectation; August 1, 2012
- IR 1397411; On-Line Actual Dose Versus Estimate; August 6, 2012
- IR 1397679; Gaps Identified with PCE Documentation; August 8, 2012
- IR 1416375; DLR was Incorrectly Positioned During Under Head Jump; August 20, 2012
- IR 1413448; Individual Lost Extremity DLR; September 13, 2012
- IR 1412889; ED Reset; September 12, 2012
- IR 1412921; Container RAM Label Deficiencies

### **2RS2: Occupational ALARA Planning and Controls (71124.02)**

- RP-AA-401; Operational ALARA Planning and Controls; Revision 13
- ALARA-10014310; BLSIV (1RC8002B) Repair Work: All Activities; Revision 0
- ALARA-10014311; Interference, Insulation, and Supporting Activities; Revision 0
- ALARA-10014313; 1B LSIV Scaffold Activities; Revision 0

- ALARA-10014308; IRC 8042C Freeze Seal; Revision 0
- ALARA-10013772; B1R18 Emergent Reactor Head Repairs of Penetrations; Revision 0

#### **40A1: Performance Indicator Verification**

- LS-AA-2150; Monthly Data Elements for NRC RETS/ODCM Radiological Effluent Occurrences; Revision 4
- LS-AA-2140; Monthly Data Elements for NRC Occupational Exposure Control Effectiveness; Revision 5
- Data Elements from January 2011 through April 2012

#### **40A2: Identification and Resolution of Problems (71152)**

- IR 1417120; OVA01CA VA Supply Fan Catastrophic Failure, September 23, 2012
- IR 1414688; 1B SX PP Tripped Unexpectedly, September 18, 2012
- IR 1415838; B1R18 1AF022A Rebuild Lessons Learned, September 20, 2012
- IR 1416002; Lost Parts in RCS From the 1RC8002B, September 19, 2012
- IR 1416068; 0A, 0B & 0C SXCT Fans Reading High Vibration, September 20, 2012
- IR 1418212; Damper Did Not Open When Fan Secured, September 25, 2012
- IR 1420640; Unit 2 Remote Shutdown Panel instrumentation Surveillance Failure, September 30, 2012
- IR 0610890; SFP Boral Coupon Exceeds Areal Density Acceptance Criterion, September 20, 2007
- IR 0438774; 2005 Modification and 50.59 FASA – Issues with EC 354059, May 25, 2005
- IR 0931482; SFP Boral Coupon Program Procedure Revision Needed, June 15, 2009
- WO 0907699; Spent Fuel Rack Boral Specimen Surveillance, March 30, 2007
- 0BVSF FH-1; Unit 0 Spent Fuel Rack Boral Specimen Surveillance ,Rev. 5
- Report HI-982094; Criticality Evaluation for the Byron/Braidwood Rack Installation Project, Rev. 1
- IR 1425327; LR SFP Boral Coupon Schedule Not In Accordance with License Amendment, October 11, 2012
- IR 1272204; 2SI8875C Instrument Air Tubing to AOV, October 4, 2012
- IR 1272208; 2SI8878B Instrument Air Tubing Not Clamped to Tube Rack, October 4, 2012
- IR 1272213; 2PS9352B Instrument Air Tubing Not Clamped to Tube Rack, October 4, 2012
- TubeTrack Product Information from the James C. White Company, Inc.
- IR 1252529; 2A DG Ventilation Fan Failed to Start during 2BOSR 8.1.2-1, August 17, 2012

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

- IR 1417888; NRC Concern with the SFP Racks Boral Coupon Test, September 24, 2012

## LIST OF ACRONYMS USED

ADAMS	Agencywide Document Access and Management System
ALARA	As-Low-As-Is-Reasonably-Achievable
ASME	American Society of Mechanical Engineers
CAP	Corrective Action Program
CDBI	Component Design Bases Inspection
CFR	Code of Federal Regulations
EPRI	Electric Power Research Institute
ESFAS	Engineered Safety Feature Actuation System
HRA	High Radiation Area
IP	Inspection Procedure
IR	Inspection Report
IR	Issue Report
ISI	Inservice Inspection
IST	Inservice Testing
LSIV	Loop Stop Isolation Valve
MCDT	Mechanical Draft Cooling Tower
NCDT	Natural Draft Cooling Tower
NCV	Non-Cited Violation
NDE	Non-Destructive Examination
NEI	Nuclear Energy Institute
NRC	U.S. Nuclear Regulatory Commission
ODCM	Offsite Dose Calculation Manual
OSP	Outage Safety Plan
PARS	Publicly Available Records System
PI	Performance Indicator
PMT	Post Maintenance Test
PT	Liquid Dye Penetrant Test
RCS	Reactor Coolant System
RETS	Radiological Effluent Technical Specification
RFO	Refueling Outage
RP	Radiation Protection
RWP	Radiation Work Permit
SG	Steam Generator
SSC	Structure, System, or Component
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
UT	Ultrasonic Testing
VHRA	Very High Radiation Area
WO	Work Order

Mr. Michael J. Pacilio  
Senior Vice President, Exelon Generation Company, LLC  
President and Chief Nuclear Office (CNO), Exelon Nuclear  
4300 Warrenville Road  
Warrenville, IL 60555

SUBJECT: BYRON STATION, UNITS 1 AND 2, NRC INTEGRATED INSPECTION  
REPORT 05000454/2012004; 05000455/2012004

Dear Mr. Pacilio:

On September 30, 2012, 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 at an exit meeting on October 10, 2012, with Mr. T. Tulon and other members of your staff.

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

Based on the results of this inspection, no findings of significance were identified.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records System (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Website at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,  
*/RA/*

Eric R. Duncan, Chief  
Branch 3  
Division of Reactor Projects

Docket Nos. 50-454, 50-455, and 07200068  
License Nos. NPF-37 and NPF-66

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Letter to M. Pacilio from E. Duncan dated October 26, 2012.

SUBJECT: BYRON STATION, UNITS 1 AND 2, NRC INTEGRATED INSPECTION  
REPORT 05000454/2012004; 05000455/2012004

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