



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

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

August 1, 2013

Mr. Michael J. Pacilio  
Senior Vice President, Exelon Generation Co., LLC  
President and Chief Nuclear Officer, Exelon Nuclear  
4300 Winfield Road  
Warrenville, IL 60555

**SUBJECT: BYRON STATION, UNITS 1 AND 2, NRC INTEGRATED INSPECTION  
REPORT 05000454/2013003; 05000455/2013003**

Dear Mr. Pacilio:

On June 30, 2013, 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 results which were discussed on July 12, 2013, with Mr. R. Kearney, 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, one NRC-identified and one self-revealed finding of very low safety significance were identified during this inspection. The findings involved 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 violations as Non-Cited Violations (NCVs) in accordance with Section 2.3.2 of the NRC Enforcement Policy.

If you contest the violations or significance of these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with copies to the Regional Administrator, RIII, 2443 Warrenville Road, Suite 210, Lisle, IL 60532-4352; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Byron Station.

If you disagree with a cross-cutting aspect assignment 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 the Byron Station.

E. Duncan

-2-

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 Agencywide Document Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

*/RA/*

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

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

Enclosure: Inspection Report 05000454/2013003 and 05000455/2013003  
w/Attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

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

Report No: 05000454/2013003; 05000455/2013003

Licensee: Exelon Generation Company, LLC

Facility: Byron Station, Units 1 and 2

Location: Byron, IL

Dates: April 1 through June 30, 2013

Inspectors: B. Bartlett, Senior Resident Inspector  
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Approved by: E. Duncan, Chief  
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) .....	5
1R05 Fire Protection (71111.05) .....	7
1R06 Flooding (71111.06).....	7
1R07 Annual Heat Sink Performance (71111.07) .....	9
1R08 Inservice Inspection Activities (71111.08P).....	9
1R11 Licensed Operator Requalification Program (71111.11).....	13
1R12 Maintenance Effectiveness (71111.12) .....	14
1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13).....	15
1R15 Operability Determinations and Functionality Assessments (71111.15).....	17
1R18 Plant Modifications (71111.18) .....	18
1R19 Post-Maintenance Testing (71111.19).....	19
1R20 Outage Activities (71111.20) .....	20
1R22 Surveillance Testing (71111.22).....	23
1EP6 Drill Evaluation (71114.06) .....	24
2. RADIATION SAFETY .....	25
2RS1 Radiological Hazard Assessment and Exposure Controls (71124.01) .....	25
4. OTHER ACTIVITIES .....	28
4OA2 Identification and Resolution of Problems (71152) .....	28
4OA3 Follow-Up of Events and Notices of Enforcement Discretion (71153).....	29
4OA6 Management Meetings .....	30
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 .....	8

## SUMMARY OF FINDINGS

Inspection Report (IR) 05000454/2013003 and 05000455/2013003; 04/01/2013 - 06/30/2013; Byron Station, Units 1 & 2; Maintenance Risk Assessment and Emergent Work Control; Outage Activities

This report covers a 3-month period of inspection by resident inspectors and announced baseline inspections by regional inspectors. One NRC-identified and one self-revealed finding of very low safety significance were identified by the inspectors. The findings involved Non-Cited Violations (NCVs) of NRC requirements. The significance of inspection findings is indicated by their color (i.e., Greater than Green, or Green, White, Yellow, Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," dated June 2, 2011. Cross-cutting aspects are determined using IMC 0310, "Components Within the Cross-Cutting Areas," dated October 28, 2011. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy dated January 28, 2013. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4.

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

#### **Cornerstone: Barrier Integrity**

- Green. A finding of very low safety significance and an associated NCV of 10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," was identified by the inspectors when licensee personnel removed both the 2B and 2D Reactor Containment Fan Coolers (RCFCs) from service without entering an elevated on-line risk status (Yellow) as required by licensee procedure WC-BY-101-1006, "On-Line Risk Management and Assessment." The licensee entered this issue into their Corrective Action Program (CAP) as Issue Report (IR) 01519964, "2B and 2D RCFC OLR [On-Line Risk] Not Communicated." As part of the licensee's corrective actions, on-line risk was revised to accurately reflect the removal of the 2B and 2D RCFCs from service.

The inspectors determined that the performance deficiency was more than minor because it was similar to IMC 0612, Appendix E, "Examples of Minor Issues," Example 7(e) that identified a failure to perform an adequate risk assessment when required by 10 CFR 50.65(a)(4) was not minor if the overall elevated plant risk placed the plant into a higher risk category established by the licensee. The inspectors determined the finding could be evaluated using the Significance Determination Process (SDP) in accordance with IMC 0609, Appendix K, "Maintenance Risk Assessment and Risk Management Significance Determination Process." In accordance with IMC 0609, Appendix K, and because the calculated Incremental Core Damage Probability Deficit (ICDPD) was not greater than  $1E-6$ , the finding was determined to be of very low safety significance. This finding had a cross-cutting aspect in the Work Control component of the Human Performance cross-cutting area because coordination efforts between the departments responsible for evaluating and communicating on-line risk failed to identify and communicate a risk increase associated with maintenance on the 2B and 2D RCFCs (H.3.b). (Section 1R13.1)

## **Cornerstone: Mitigating Systems**

Green. A finding of very low safety significance and an associated NCV of Technical Specification (TS) 5.4.1 was self-revealed when a configuration control error during a local leak rate test (LLRT) resulted in the inadvertent draining of the spent fuel pool (SFP). The licensee entered this issue into their CAP as IR 1506862, "SFP Level Reduced." Licensee corrective actions included isolating the leak and restoring SFP level to normal.

The inspectors determined that the performance deficiency was more than minor because it was associated with the Human Performance attribute of the Barrier Integrity Cornerstone and adversely impacted the cornerstone objective of providing reasonable assurance that physical design barriers (fuel cladding, reactor coolant system, and containment) protect the public from radionuclide releases caused by accident or events. The finding was screened in accordance with IMC 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings," and was determined to be of very low safety significance since the finding was not associated with the loss of cooling to the SFP that would have precluded restoration prior to boiling, a fuel handling error, or loss of SFP inventory below the minimum analyzed level limit specified in the site-specific licensing basis. This finding had a cross-cutting aspect in the Work Practices component of the Human Performance cross-cutting area because operators did not use human error prevention techniques commensurate with the risk of the assigned task nor did personnel stop work in the face of uncertainty (H.4.a). (Section 1R20.1)

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

None.

## REPORT DETAILS

### Summary of Plant Status

Unit 1 operated at or near full power during the inspection period.

Unit 2 began the inspection period at full power and entered a scheduled refueling outage on April 8, 2013. Unit 2 was returned to service on May 1, 2013, with no significant plant or personnel issues.

### 1. REACTOR SAFETY

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

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

##### .1 Readiness of Offsite and Alternate Alternating Current (AC) Power Systems

##### a. Inspection Scope

The inspectors verified that plant features and procedures for operation and continued availability of offsite and alternate AC power systems during adverse weather were appropriate. The inspectors reviewed the licensee's procedures affecting these areas and the communication protocols between the transmission system operator (TSO) and the plant to verify that appropriate information was exchanged when issues arose that could impact the offsite power system. Examples of aspects considered in the inspectors' review included:

- The coordination between the TSO and plant personnel during off-normal or emergency events;
- The explanations for the events;
- The estimates of when the offsite power system would be returned to a normal state; and
- The notifications from the TSO to plant personnel when the offsite power system was returned to normal.

The inspectors also verified that plant procedures addressed measures to monitor and maintain availability and reliability of both the offsite AC power system and the onsite alternate AC power system prior to or during adverse weather conditions. Specifically, the inspectors verified that the procedures addressed the following:

- The actions to be taken when notified by the TSO that the post-trip voltage of the offsite power system at the plant would not be acceptable to assure the continued operation of the safety-related loads without transferring to the onsite power supply;
- The compensatory actions identified to be performed if it would not be possible to predict the post-trip voltage at the plant for the current grid conditions;

- A re-assessment of plant risk based on maintenance activities which could affect grid reliability, or the ability of the transmission system to provide offsite power; and
- The communications between plant personnel and the TSO when changes at the plant could impact the transmission system, or when the capability of the transmission system to provide adequate offsite power was challenged.

Documents reviewed are listed in the Attachment. The inspectors also reviewed 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.

This inspection constituted one readiness of offsite and alternate AC power systems sample as defined in Inspection Procedure (IP) 71111.01-05.

b. Findings

No findings were identified.

.2 Summer Seasonal Readiness Preparations

a. Inspection Scope

The inspectors performed a review of the licensee's preparations for summer weather for selected systems, including conditions that could lead to an extended drought.

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. The inspectors also verified the licensee was identifying adverse weather issues at an appropriate threshold and entering them into their CAP in accordance with station corrective action procedures. The inspectors' reviews focused specifically on the following plant systems:

- Diesel Generators (DGs); and
- Switchyard (SY).

Documents reviewed are listed in the Attachment.

This inspection constituted one seasonal adverse weather sample as defined in IP 71111.01-05.

b. Findings

No findings were identified.



.3 Readiness for Impending Adverse Weather Conditions – Severe Thunderstorms and Tornado Warnings

a. Inspection Scope

Since thunderstorms with potential tornados and high winds were forecast in the vicinity of the facility for June 12, 2013, the inspectors reviewed the licensee's overall preparations and protection for the expected weather conditions. On June 12, 2013, the inspectors walked down the Auxiliary Power and Direct Current (DC) systems, in addition to the licensee's emergency AC power systems, because their safety-related functions could be affected or required as a result of high winds or tornado-generated missiles or the loss of offsite power. The inspectors compared the licensee staff's preparations with site procedures and determined whether the staff's planned actions were adequate. During the inspection, the inspectors focused on plant-specific design features and the licensee's procedures used to respond to specified adverse weather conditions. The inspectors also toured the plant grounds to look for any loose debris that could become missiles during a tornado. The inspectors evaluated operator staffing and accessibility of controls and indications for those systems required to control the plant. Additionally, the inspectors reviewed the UFSAR and performance requirements for systems selected for inspection, and verified that operator actions were appropriate as specified by plant specific procedures. The inspectors also verified that the licensee identified adverse weather issues at an appropriate threshold and dispositioned them through the CAP in accordance with station corrective action procedures. Documents reviewed are listed in the Attachment.

This inspection constituted one readiness for impending adverse weather condition sample as defined in IP 71111.01-05.

b. Findings

No findings 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 2 Reactor Containment Fan Coolers (RCFCs) During Unit 2 Refueling Outage (RFO) B2R17;
- Unit 2 Containment Spray; and
- Unit 2 Safety Injection Accumulators.

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 UFSAR, Technical Specification (TS) requirements, outstanding

work orders (WOs), issue reports (IRs), 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 were 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 three partial system walkdown samples as defined in IP 71111.04-05.

b. Findings

No findings were identified.

.2 Semi-Annual Complete System Walkdown

a. Inspection Scope

On April 23, 2013, the inspectors performed a complete system alignment inspection of the Unit 2 safety injection 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. The inspectors walked down the system to review mechanical and electrical equipment lineups; electrical power availability; system pressure and temperature indications; 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 the availability, accessibility, and the condition of firefighting equipment in the following risk-significant plant areas:

- Fire Zone 5.4-1, Division 12 Miscellaneous Electrical Equipment Room;
- Fire Zone 5.4-2, Division 22 Miscellaneous Electrical Equipment Room;
- Fire Zone 5.6-1, Division 11 Miscellaneous Electrical Equipment Room; and
- Fire Zone 5.6-2, Division 21 Miscellaneous Electrical Equipment Room.

The inspectors reviewed these areas and determined whether 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 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 four 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. 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 applicable commitments:

- Essential Service Water (SX) Pump Rooms

Documents reviewed are listed in the Attachment.

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

b. Findings

No findings were identified.

.2 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 verified 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, such as a sump pump, were used the inspectors verified that 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 submerged conditions. The inspectors also reviewed the licensee's corrective action documents with respect to past submerged cable issues identified in the CAP to verify the adequacy of the corrective actions. The inspectors performed a walkdown of the following underground bunkers/manholes subject to flooding:

- SX Tower Manholes

Documents reviewed are listed in the Attachment.

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

b. Findings

No findings were identified.

1R07 Annual Heat Sink Performance (71111.07)

.1 Heat Sink Performance

a. Inspection Scope

The inspectors reviewed the licensee's testing of the Unit 2 Train 'B' auxiliary feedwater pump lube oil and gear oil heat exchangers to verify that potential deficiencies did not mask the licensee's ability to detect degraded performance, to identify any common cause issues that had the potential to increase risk, and to ensure that the licensee was adequately addressing problems that could result in initiating events that would cause an increase in risk. The inspectors reviewed the licensee's observations as compared against acceptance criteria, the correlation of scheduled testing and the frequency of testing, and the impact of instrument inaccuracies on test results. The inspectors also verified that test acceptance criteria considered differences between design conditions and testing conditions. Documents reviewed are listed in the Attachment.

This annual heat sink performance inspection constituted one sample as defined in IP 71111.07-05.

b. Findings

No findings were identified.

1R08 Inservice Inspection Activities (71111.08P)

From April 8 through April 19, 2013, the inspectors conducted a review of the implementation of the licensee's Inservice Inspection (ISI) Program for monitoring degradation of the Unit 2 reactor coolant system (RCS), steam generator (SG) tubes, emergency feedwater system, risk-significant piping and components, and containment systems.

The inspections described in Sections 1R08.1, 1R08.2, R08.3, 1R08.4, and 1R08.5 below constitute one inspection sample as defined by IP 71111.08-05. Documents reviewed are listed in the Attachment.

.1 Piping Systems Inservice Inspection

a. Inspection Scope

The inspectors observed/reviewed the following nondestructive examinations 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 applicable Code Case and Section V requirements, and if any indications were detected, determined whether these indications were dispositioned in accordance with the ASME Code or an NRC-approved alternative requirement:

- Magnetic Particle (MT) Examination of Main Steam Nozzle to Steam Generator Head Weld 2RC-01-BB/SGN-03, Report No. B2R17-MT-001;
- Liquid Dye Penetrant (PT) Examination of Safety Injection Line Welds 1 - 3 (2SI8819A), Report No. 2011-512;

- PT Examination of Safety Injection Line Welds 4 - 7 (2SI8819A), Report No. 2011-404;
- PT Examination of Safety Injection Line Pipe to Fitting Weld 8 (2SI8819A), Report No. 2011-529;
- PT Examination of Safety Injection Line Seal Weld 9 (2SI8819A), Report No. 2011-531;
- Ultrasonic Testing (UT) Examination of Feedwater Line Weld 2FW81BD-6, Weld 107, Report No. B2R17-UT-009;
- UT Examination of Feedwater Line Weld 2FW81BD-6, Weld 107, Report No. B2R17-UT-010;
- UT Examination of Feedwater Line Weld 2FW81BD-6, Weld 107, Report No. B2R17-UT-011;
- UT Examination of Feedwater Line Weld 2FW81BD-6, Weld 107, Report No. B2R17-UT-012;
- Visual Examination of Reactor Pressure Vessel (RPV) Head Penetrations 1-78 and Vent Line, Work Order 1480228-01;
- UT Examination of RPV Head Penetration Weld 68, Report No. CBE-R17-CP02-68-01,02,03; and
- PT Examination of RPV Head Penetration Weld 68, Report No. 2013-119.

During prior Refueling Outage (RFO) B2R16 non-destructive surface and volumetric examinations, the licensee did not identify any relevant/recordable indications. Therefore, no NRC review was completed for this inspection procedure attribute.

The inspectors reviewed the following pressure boundary welds completed for risk significant systems during the Unit 2 refueling outage to determine whether the licensee applied the preservice non-destructive examinations and acceptance criteria required by the construction code, and NRC-approved Code Case N-416. Additionally, the inspectors reviewed the welding procedure specification and supporting weld procedure qualification records to determine whether the weld procedures were qualified in accordance with the requirements of the construction code and ASME Code Section IX:

- Welds 1 through 7 performed during safety injection system check valve 2SI8819A replacement (WO 01376765-01).

b. Findings

No findings were identified.

.2 RPV Upper Head Penetration Inspection Activities

The inspectors reviewed records of RPV head inspection activities to determine whether the activities were performed in accordance with the licensee's commitments to NRC Order EA-03-009, and if any indications were detected, to determine whether these were dispositioned in accordance with the ASME Code or an NRC-approved alternative requirement.

The inspectors also reviewed the RPV visual examination procedure ER-AP-335-001, Revision 1, and determined whether the procedure incorporated the requirements of ASME Code Case N-729-1 and 10 CFR 50.55a(g)(6)(ii)(D).

a. Inspection Scope

For the Unit 2 RPV head and in accordance with Relief Request I3R-16, the licensee was approved to perform volumetric and/or surface examinations of all penetrations at a frequency of once every second refueling outage or 4 calendar years, whichever was less, except for penetration Nozzle 68 (received weld overlay during the B2R13 Outage), which was to be volumetrically, surface, and visually examined each refueling outage. In accordance with the alternative examination frequency approved in Relief Request I3R-16, the licensee performed a bare metal visual examination of all penetrations and a UT and PT examination of penetration Nozzle 68.

The inspectors reviewed records (WO 01480228 01) of the Unit 2 RPV head bare metal visual examination conducted on the 78 reactor vessel head penetrations and vent line in addition to records of the UT and PT examinations of penetration Nozzle 68 to determine whether 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 licensee did not perform any welded repairs to vessel head penetrations since the beginning of the preceding outage for Unit 2. Therefore, no NRC review was completed for this inspection procedure attribute.

b. Findings

No findings were identified.

.3 Boric Acid Corrosion Control

a. Inspection Scope

The inspectors performed an independent walkdown of all portions of accessible containment systems which had received a recent licensee boric acid walkdown and determined whether the licensee's boric acid corrosion control visual examinations emphasized locations where boric acid leaks could cause degradation of safety-related components.

The inspectors reviewed the following licensee evaluations of RCS components with boric acid deposits to determine whether degraded components were documented in the CAP. The inspectors also evaluated corrective actions for any degraded RCS components to determine whether they met the ASME Section XI Code.

- IR 1490434: 2CV225 - Leak-By Past Vent Valve and Cap-Boric Acid; and
- IR 1490424: 2RH029A - Valve Leak-By, Minor Boric Acid Accumulation on Cap.

The inspectors reviewed the corrective actions for the listed work requests (WRs) related to evidence of boric acid leakage to determine whether the corrective actions completed were consistent with the requirements of the ASME Code Section XI and 10 CFR Part 50, Appendix B, Criterion XVI.

- WR 00357468: Pump Seal Has Small Boric Acid Leak (IR 1165649); and
- WR 00428212: 2SI8877B - Minor Dried Boric Packing Leak (IR 1490431).

b. Findings

No findings were identified.

.4 Steam Generator Tube Inspection Activities

a. Inspection Scope

For the Unit 2 SGs, no examination was required pursuant to the TSs during this 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 whether:

- 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. Documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.



1R11 Licensed Operator Requalification Program (71111.11)

.1 Quarterly Review of Licensed Operator Requalification (71111.11Q)

a. Inspection Scope

On June 11, 2013, the inspectors observed a crew of licensed operators in the plant's simulator during licensed operator requalification training 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, procedural compliance, and successful critical task completion requirements. Documents reviewed are listed in the Attachment.

This inspection constituted one quarterly licensed operator requalification program simulator sample as defined in IP 71111-05.

b. Findings

No findings were identified.

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

a. Inspection Scope

On June 10, 2013, the inspectors observed a deliberate entry into a 1-hour Limiting Condition for Operation (LCO) on Unit 2 in an attempt to fully seat a safety injection system check valve. This was an activity that required heightened awareness or 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 successful critical 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:

- Trip of a Unit 2 stator cooling water (GC) pump that resulted in a reactor trip following a previous maintenance-related failure of the redundant GC pump; and
- Sump check valves protecting the SX pump rooms and the diesel oil storage tank (DOST) rooms from internal flooding.

The inspectors reviewed events including those in which 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, or components (SSCs)/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.

This inspection constituted two 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 appropriate risk assessments were performed prior to removing equipment for work:

- Work activities for the week of May 20, 2013, including 0F SX cooling tower fan, OB main control room air conditioning, and 1B DG damper work;
- Unit 2 RFO B2R17 Outage Safety Plan (OSP);
- Work scheduled for the 2B and 2D RCFCs; and
- Performance of the Unit 1 Train 'A' DG 18-month surveillance with predicted severe weather.

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. Documents reviewed are listed in the Attachment.

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

b. Findings

(1) Inaccurate Risk Assessment

Introduction: A finding of very low safety significance (Green) and an associated NCV of 10 CFR 50.65, "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," was identified by the inspectors when licensee personnel failed to adequately assess and manage risk associated with planned maintenance on the Unit 2 Reactor Containment Fan Coolers (RCFCs). Specifically, the licensee removed both the 2B and 2D RCFCs from service without entering an elevated on-line risk status (Yellow) as required by licensee procedure WC-BY-101-1006, "On-Line Risk Management and Assessment."

Description: On May 31, 2013, at 12:54 a.m. while performing planned maintenance on the Unit 2 RCFCs, the licensee simultaneously removed both the 2B and 2D RCFCs from service. During routine observations in the main control room later that morning, the inspectors noted that the on-line risk for Unit 2 was Green. The inspectors recalled that when similar RCFC-related work had been performed previously, the on-line risk had been assessed as Yellow and that risk management actions (RMAs) had been implemented. The inspectors spoke with the Unit 2 Supervisor and confirmed that both the 2B and 2D RCFCs remained out of service and that on-line risk was Green. The inspectors discussed the current risk assessment with licensee risk assessment specialists who subsequently performed a second on-line risk assessment for the current plant configuration with the 2B and 2D RCFCs out of service and determined that the on-line risk was Yellow.

The inspectors contacted the Unit 2 Supervisor and discussed this new information. Additionally, the inspectors spoke with licensee staff in both the Work Control and Operations departments. The licensee promptly verified the configuration of plant equipment and verified the inputs to the on-line risk assessment. Following these efforts, the on-line risk assessment for Unit 2 was revised to Yellow. This issue was subsequently entered into the CAP as Issue Report (IR) 1519964, "2B and 2D RCFC Fans OLR [On-Line Risk] Not Communicated."

The licensee determined that the cause of this event was related to a human performance error. The licensee used computer software to perform the on-line risk assessment process and a human performance error occurred when transferring on-line risk information from the software into other documents used to communicate risk between departments. No issues were identified in the software or procedures used by the licensee to determine on-line risk. The inspectors reviewed information contained in the CAP and spoke with individuals involved with this issue. The inspectors agreed with the licensee's conclusions and no additional concerns were identified.

Analysis: The inspectors determined that the failure to appropriately assess on-line risk as prescribed by licensee procedure WC-BY-101-1006, "On-Line Risk Management and Assessment," was a performance deficiency.

The finding was determined to be more than minor because the finding was similar to IMC 0612, Appendix E, "Examples of Minor Issues," Example 7(e) that identified a failure to perform an adequate risk assessment when required by 10 CFR 50.65(a)(4) was not minor if the overall elevated plant risk placed the plant into a higher risk category established by the licensee.

The inspectors also determined that the performance deficiency was more than minor because if left uncorrected, the performance deficiency had the potential to lead to a more significant safety concern. In particular, the inspectors determined that if left uncorrected, a failure to identify an increase in on-line risk during future planned maintenance activities could result in actual adverse consequences as a result of the lack of overall awareness of the on-line risk increase by plant staff, including operations personnel in the main control room.

The inspectors determined the finding could be evaluated using the SDP in accordance with IMC 0609, Appendix K, "Maintenance Risk Assessment and Risk Management Significance Determination Process." In accordance with IMC 0609, Appendix K, a Senior Reactor Analyst (SRA) contacted the licensee and obtained the change in core

damage frequency (CDF) for the maintenance configurations that existed during the work week for one RCFC out of service and two RCFCs out of service. Using this information and the duration of the out-of-service time of 9 hours, the SRA calculated the Incremental Core Damage Probability (ICDPD) and determined that it was much less than 1E-6. The licensee's risk analysis staff further explained that although the correct CDF and large early release frequency (LERF) changes had been calculated for the maintenance risk assessment, an error had been made during the deterministic assessment of the safety function trees, which were used in combination with the quantitative risk evaluation. In accordance with IMC 0609, Appendix K, and because the calculated ICDPD was not greater than 1E-6, the finding was determined to be of very low safety significance (Green).

This finding had a cross-cutting aspect in the Work Control component of the Human Performance cross-cutting area (H.3.b) because licensee personnel did not appropriately coordinate work activities by incorporating actions to address the impact of the work on different job activities, and the need for work groups to maintain interfaces with offsite organizations, and communicate, coordinate, and cooperate with each other during activities in which interdepartmental coordination is necessary to assure plant and human performance. Specifically, coordination efforts between the departments responsible for evaluating and communicating on-line risk failed to identify and communicate a risk increase associated with maintenance on the 2B and 2D RCFCs.

Enforcement: 10 CFR Part 50.65(a)(4), requires, in part, that the licensee assess and manage the increase in risk that may result from proposed maintenance activities.

Contrary to the above, on May 31, 2013, licensee personnel failed to assess and manage the increase in risk that resulted from planned maintenance activities. Specifically, the licensee's on-line risk assessment did not accurately reflect the increase in on-line risk associated with the removal from service of the 2B and 2D RCFCs. As part of the licensee's immediate corrective actions, on-line risk was revised to accurately reflect the removal of the 2B and 2D RCFCs from service. Because this violation was of very low safety significance and it was entered into the licensee's CAP as IR 01519964, "2B and 2D RCFC Fans OLR [On-Line Risk] Not Communicated," this violation is being treated as a NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. **(NCV 05000455/2013003-01, "Inaccurate Risk Assessment")**

## 1R15 Operability Determinations and Functionality Assessments (71111.15)

### .1 Operability Evaluations

#### a. Inspection Scope

The inspectors reviewed the following issues:

- 'A' Train SX Pump Room Door;
- Unit 1 Train 'A' and 'B' DG Rolling Steel Door Supports;
- Motor Control Centers Not Tested at Minimum Pick-up Voltage;
- Operability Evaluation 12-007, MSIV [Main Steam Isolation Valve] Accumulator Heat-up Concern;
- Operability Evaluation 13-003, 1B DG Head Possible Oil Accumulation (Part 21 Notification);

- SX Cooling Tower Cell 0F; and
- Fire Door Conditions While Performing High Energy Line Break (HELB) Restoration Changes.

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 the 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 seven samples as defined in IP 71111.15-05.

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18)

.1 Plant Modifications

a. Inspection Scope

The inspectors reviewed the following modification:

- Installation of a Temporary Pump to Fill the 2D Safety Injection Accumulator

The inspectors reviewed the configuration changes and associated 10 CFR 50.59 safety evaluation screening against the design basis, the UFSAR, and the TS, as applicable, to verify that the modification did not affect the operability or availability of the affected system. The inspectors, as applicable, observed ongoing and completed work activities to ensure that the modification was installed as directed and consistent with design control documents; the modification operated as expected; post-modification testing adequately demonstrated continued system operability, availability, and reliability; and that operation of the modification did not impact the operability of any interfacing systems. As applicable, the inspectors verified that relevant procedure, design, and licensing documents were properly updated. Lastly, the inspectors discussed the plant modification with operations, engineering, and training personnel to ensure that the individuals were aware of how operation with the plant modification in place could impact overall plant performance. Documents reviewed are listed in the Attachment.

This inspection constituted one temporary modification sample as defined in IP 71111.18-05.

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 activities to verify that procedures and test activities were adequate to ensure system operability and functional capability:

- Unit 2 Train 'B' DG Ventilation Performance Testing Post HELB Damper Installation;
- Unit 2 Train 'B' DG Sequencer Test Following Replacement of Relay 427-B242X5;
- Unit 2 Train 'B' Charging Pump Miniflow Isolation Valve Multiple Spurious Operation Modification; and
- Unit Common Train 'B' SX Riser Valve Following Actuator Replacement.

These activities were selected based upon the SSC'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 TSs, 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 into the CAP at the appropriate threshold and that the problems were being corrected commensurate with their importance to safety. Documents reviewed are listed in the Attachment.

This inspection constituted four 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 Unit 2 RFO B2R17 conducted April 6 - April 30, 2013, to confirm that the licensee had appropriately considered risk, industry operating experience, and previous site-specific problems in developing and implementing a plan that assured maintenance of defense-in-depth. During RFO B2R17, the inspectors observed portions of the shutdown and cooldown processes and monitored licensee controls over the outage activities listed below:

- 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 fuel pool cooling (FC) 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;
- maintenance of secondary containment as required by TSs;
- licensee fatigue management, as required by 10 CFR 26, Subpart I;
- refueling activities, including fuel handling and sipping to detect fuel assembly leakage;
- startup and ascension to full power operation, tracking of startup prerequisites, walkdown of primary containment to verify that debris had not been left which could block emergency core cooling system suction strainers, and reactor physics testing; and
- licensee identification and resolution of problems related to RFO activities.

Documents reviewed are listed in the Attachment.

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

b. Findings

Failure to Establish Procedure to Control Spent Fuel Pool Cooling System

Introduction: A finding of very low safety significance (Green) and an associated NCV of TS 5.4.1 was self-revealed when a configuration control error resulted in the inadvertent draining of the spent fuel pool (SFP).



Description: During Unit 2 RFO B2R17, licensee personnel performed a routine local leak rate test (LLRT) of containment penetration P-32. Penetration P-32 was one of several flow paths from the SFP cooling water pumps to the Unit 2 refueling cavity. As part of an outage-related LLRT, a portion of the FC system was removed from service, which included altering the normal position of certain FC valves. The LLRT activity, including required valve manipulations, was controlled by licensee procedure 2BOSR 6.1.1-13, "Unit 2 Primary Containment Type C Local Leakage Rate Test of Fuel Pool Cooling System."

Local leak rate testing personnel isolated and drained the portion of the FC system being tested, which included the closing of test boundary valves and the opening of drain valves in the FC system. One of the boundary valves closed was 2FC014, the Unit 2 SFP Filter Bypass Valve. One of the drain valves opened for the test was 2FC034. In addition to opening the drain valve, licensee personnel placed a hose on the drain valve outlet to direct contaminated water to a nearby auxiliary building floor drain to minimize floor contamination.

During plant operations, the position of FC valves are normally controlled through licensee procedure BOP FC-1, "Fuel Pool Cooling System Startup and SFP Purification System Operation," using a marked up one-line diagram in BOP FC-T2, "FC System One-Line Diagram." When valves are manipulated, their positions are revised on a new T2 sheet associated with BOP FC-1 and the T2 sheet is maintained in the Work Execution Center (WEC).

On April 25, 2013, licensee personnel performing the LLRT on penetration P-32 re-positioned valve 2FC034 to the open position as required by their LLRT procedure, but did not clearly inform the WEC supervisor of the revised valve position status or update the T2 sheet in the WEC. In addition, other opportunities to communicate the status of the FC valves were not utilized including the failure to place "Test in Progress" tags on the valves being manipulated, although this was recommended in the LLRT testing procedure.

The LLRT test was subsequently delayed over a crew shift change, and the valve position status was not communicated to the oncoming LLRT testing crew during shift turnover. The relieving crew did not continue with performing the penetration P-32 LLRT, but instead performed other work. This left the penetration P-32 LLRT valves in an off-normal position for an extended period. Subsequently, a non-licensed equipment operator (EO) responsible for the FC system questioned why FC system flow rates were different than what was expected. The EO compared the plant lineup to the T2 sheet maintained in the WEC and determined that valve 2FC014 was not in its expected position. After verifying with the WEC supervisor that the current T2 sheet identified valve 2FC014 as being in the open position, and with valve 2FC014 found by the EO in the closed position, the EO opened 2FC014.

With 2FC014 open, a flowpath was created between the SFP to the floor drain through 2FC014 and 2FC034. As a result, water drained out of the SFP until level decreased about 2.5 inches, which represented a loss of about 2,500 gallons from the SFP. At this point, main control room operators received a SFP low level alarm and an EO was dispatched to assess the situation. The EO identified the leaking drain and isolated the leak by closing valve 2FC014.

This issue was entered into the licensee's CAP as IR 1506862, "SFP Level Reduced." Licensee corrective actions included isolating the leak and restoring SFP level to normal. Also, management met with personnel to stress the importance of bringing attention to valves potentially out of position, and conducted additional training with the operators involved in the event. In addition, other LLRT procedures that could affect the FC system were reviewed to ensure there was a proper understanding of the system configuration.

The inspectors reviewed the licensee's apparent cause evaluation, including the corrective actions and extent of condition review. The SFP level did not decrease below the TS 3.7.14 limit of 23 feet. No fuel movements were in progress and the SFP cooling pumps were not challenged by the decrease in SFP level.

Analysis: The inspectors determined that the failure to maintain control of SFP level due to a configuration control error was a performance deficiency.

The performance deficiency was screened in accordance with IMC 0612, Appendix B, "Issue Screening." The inspectors determined that the performance deficiency was more than minor because it was associated with the Human Performance attribute of the Barrier Integrity Cornerstone and adversely impacted the cornerstone objective of providing reasonable assurance that physical design barriers (fuel cladding, reactor coolant system, and containment) protect the public from radionuclide releases caused by accident or events. The finding was screened in accordance with IMC 0609, Attachment 4, "Phase 1 – Initial Screening and Characterization of Findings," and was determined to be of very low safety significance since the finding was not associated with the loss of cooling to the SFP that would have precluded restoration prior to boiling, a fuel handling error, or loss of SFP inventory below the minimum analyzed level limit specified in the site-specific licensing basis.

This finding had a cross-cutting aspect in the Work Practices component of the Human Performance cross-cutting area because operators did not use human error prevention techniques commensurate with the risk of the assigned task nor did personnel stop work in the face of uncertainty (H.4.a).

Enforcement: Technical Specification 5.4.1 requires, in part, that written procedures shall be established, implemented, and maintained covering the applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, dated February 1978. Regulatory Guide 1.33, Appendix A, Section 3, "Procedures for Startup, Operation, and Shutdown of Safety-Related PWR [Pressurized Water Reactor] Systems," Subsection (h) addressed, "Fuel Storage Pool Purification and Cooling System."

Contrary to the above, on April 26, 2013, the licensee failed to establish a procedure to address the requirements of Regulatory Guide 1.33, Appendix A, Section 3.h. Specifically, licensee procedure 2BOSR 6.1.1-13, "Unit 2 Primary Containment Type C Local Leakage Rate Test of Fuel Pool Cooling System," failed to include provisions to ensure that during manipulations of FC cooling system valves, that the components would be controlled so as to prevent an inadvertent drain down of the SFP. Licensee corrective actions included isolating the leak and restoring SFP level to normal. Also, management met with all personnel to stress the importance of bringing attention to the identification of valves potentially out of position, and conducted additional training with the operators involved in the event. In addition, other LLRT procedures that could affect

the FC system were reviewed to ensure there was a proper understanding of the system configuration. Because this violation was of very low safety significance and because this issue was entered into the licensee's CAP as IR 1506862, "SFP Level Reduced," this violation is being treated as a NCV consistent with Section 2.3.2 of the Enforcement Policy. **(NCV 05000455/2013003-02, "Failure to Establish a Procedure to Control the Spent Fuel Pool Cooling System")**

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 2 Train 'B' Charging Pump Comprehensive Inservice Test (IST);
- Unit 2 Train 'B' DG Safety Injection Signal Override Test (Routine);
- Unit 2 Train 'A' Solid State Protection System Surveillance (Routine);
- Local Leak Rate Test of Valves 2SI8880 and 2SI8968 (ISO Valve);
- Unit 2 Train 'A' Pressurizer Power-Operated Relief Valve (PORV) Accumulator Pressure Decay Test (Routine);
- Unit 2 DC Bus 211 Battery Load Test (Routine);
- Unit 1 Train 'A' Auxiliary Feedwater Flow Control Valve Surveillance (IST); and
- Unit 2 Train 'A' Pressurizer PORV Accumulator Pressure Decay Test (Routine).

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, demonstrate operational readiness, and consistent with the system design basis;
- was plant equipment calibration correct, accurate, and properly documented;
- were as left setpoints within required ranges; and was the calibration frequency in accordance with TSs, the UFSAR, plant procedures, and applicable commitments;
- was measuring and test equipment calibration current;
- was the test equipment used within the required range and accuracy;
- were applicable prerequisites described in the test procedures satisfied;
- did test frequencies meet TS requirements and demonstrate operability and reliability;
- were tests performed in accordance with the test procedures and other applicable procedures;
- were jumpers and lifted leads controlled and restored where used;
- were test data and results accurate, complete, within limits, and valid;
- was test equipment removed following testing;

- where applicable for IST activities, was testing performed in accordance with the applicable version of Section XI of the ASME Code, and reference values consistent with the system design basis;
- was the unavailability of the tested equipment appropriately considered in the performance indicator data;
- where applicable, were test results not meeting acceptance criteria addressed with an adequate operability evaluation, or was the system or component declared inoperable;
- where applicable for safety-related instrument control surveillance tests, was the reference setting data accurately incorporated into the test procedure;
- was equipment returned to a position or status required to support the performance of its safety function following testing;
- were all problems identified during the testing appropriately documented and dispositioned in the licensee's CAP;
- where applicable, were annunciators and other alarms demonstrated to be functional and annunciator and alarm setpoints consistent with design documents; and
- where applicable, were alarm response procedure entry points and actions consistent with the plant design and licensing documents.

Documents reviewed are listed in the Attachment.

This inspection constituted five routine surveillance testing samples, two inservice testing samples, and one containment isolation valve testing sample as defined in IP 71111.22, Sections -02 and -05.

b. Findings

No findings were identified.

1EP6 Drill Evaluation (71114.06)

.1 Training Observation

a. Inspection Scope

The inspector observed a simulator training evolution for licensed operators on June 11, 2013, which required Emergency Plan implementation by a licensee operations crew. This evolution was planned to be evaluated and included in performance indicator data regarding drill and exercise performance. The inspectors observed event classification and notification activities performed by the crew. The inspectors also attended the post-evolution critique for the scenario. The focus of the inspectors' activities was to note any weaknesses and deficiencies in the crew's performance and ensure that the licensee evaluators noted the same issues and entered them into the CAP. As part of the inspection, the inspectors reviewed the scenario package and other documents listed in the Attachment.

This inspection constituted one training evolution with emergency preparedness drill aspects 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)

This inspection constituted a partial sample as defined in IP 71124.01-05.

.1 Radiological Hazard Assessment (02.02)

a. Inspection Scope

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 conditions and performed independent radiation measurements to verify conditions.

The inspectors selected the following radiologically risk-significant work activities that involved exposure to radiation:

- MSIP [Mechanical Stress Improvement Program] Process/External Measurements/Testing;
- 2SI8900 A/B/C/D Repairs/Replacements; and
- Spent Filter Replacement.

For these work activities, the inspectors assessed whether the pre-work surveys performed were appropriate to identify and quantify the radiological hazard and to establish adequate protective measures. The inspectors evaluated the radiological survey program to determine if hazards were properly identified, including the following:

- identification of hot particles;
- the presence of alpha emitters;
- the potential for airborne radioactive materials, including the potential presence of transuranics and/or other hard-to-detect radioactive materials. (This evaluation may include licensee planned entry into non-routinely entered areas subject to previous contamination from failed fuel);
- the hazards associated with work activities that could suddenly and severely increase radiological conditions and whether the licensee has established a means to inform workers of changes that could significantly impact their occupational dose; and
- severe radiation field dose gradients that could result in non-uniform exposures of the body.

The inspectors observed work in potential airborne areas and evaluated whether the air samples were representative of the breathing air zone. The inspectors evaluated whether continuous air monitors were located in areas with low background to minimize

false alarms and were representative of actual work areas. The inspectors evaluated the licensee's program for monitoring levels of loose surface contamination in areas of the plant with the potential for the contamination to become airborne.

b. Findings

No findings were identified.

.2 Instructions to Workers (02.03)

a. Inspection Scope

The inspectors selected various containers holding non-exempt licensed radioactive materials that may cause unplanned or inadvertent exposure of workers, and assessed whether the containers were labeled and controlled in accordance with 10 CFR 20.1904, "Labeling Containers," or met the requirements of 10 CFR 20.1905(g), "Exemptions To Labeling Requirements."

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

- RWP 10014064 - MSIP Process/External Measurements/Testing;
- RWP 10014034 - 2SI8900 A/B/C/D Repairs/Replacements; and
- RWP 10014073 - Spent Filter Replacement with a Boroscope Reading of Less Than 7.2 Rem/Hour and All Associated Activities.

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.

b. Findings

No findings were identified.

.3 Contamination and Radioactive Material Control (02.04)

a. Inspection Scope

The inspectors observed locations where the licensee monitored 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 prevented 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 appropriate guidance on how to respond to an alarm that indicated the presence of licensed radioactive material.

b. Findings

No findings were identified.

.4 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.

b. Findings

No findings were identified.

.5 Radiation Worker Performance (02.07)

a. Inspection Scope

The inspectors observed radiation worker performance with respect to stated radiation protection work requirements. The inspectors assessed whether workers were aware of the radiological conditions in their workplace and the RWP controls/limits in place, and whether their performance reflected the level of radiological hazards present.

b. Findings

No findings were identified.

.6 Radiation Protection Technician Proficiency (02.08)

a. Inspection Scope

The inspectors observed the performance of the radiation protection technicians with respect to all radiation protection work requirements. The inspectors evaluated whether technicians were aware of the radiological conditions in their workplace and the RWP controls/limits, and whether their performance was consistent with their training and qualifications with respect to the radiological hazards and work activities.

b. Findings

No findings were identified.

#### 4. OTHER ACTIVITIES

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

#### 4OA2 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 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 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 Attachment.

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 Daily Corrective Action Program Reviews

###### a. Inspection Scope

To facilitate 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 IR 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.



.3 Selected Issue Follow-Up Inspection

a. Inspection Scope

Unit 2 'T' Hot Reduction Program

During a review of differences between Unit parameters, the inspectors identified an inconsistency between statements within the UFSAR and operational parameters. Specifically, the UFSAR described a 'T' Hot reduction program associated with the Unit 2 SGs for the purpose of reducing the effects of Primary Water Stress Corrosion Cracking (PWSCC). This included target temperatures for the hot leg [water coming directly from the reactor] of the Unit 2 SGs. This item was selected because the actual parameters were different from those described in the UFSAR. This issue was entered into the licensee's CAP as IR 1529409, "UFSAR Clarification Needed for T Hot Reduction." The following items were specifically reviewed:

- T Hot Reduction Program for Byron Unit 2

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

Loss of Spent Fuel Pool Level

The inspectors reviewed the licensee's corrective actions to address the configuration control event documented in Section 71111.20, "Refueling Outages," of this inspection report. The inspectors determined whether the licensee causal evaluation and corrective actions were timely and reasonable.

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

b. Findings

No findings were identified.

4OA3 Follow-Up of Events and Notices of Enforcement Discretion (71153)

.1 (Closed) Licensee Event Report (LER) 05000455/2013-001-00: "Unit 2 Manual Reactor Trip Due to Loss of Main Generator Stator Cooling Water"

Licensee Event Report 05000455/2013-001-00, "Unit 2 Manual Reactor Trip Due to Loss of Main Generator Stator Cooling Water," discussed the manual trip of Byron Unit 2 on March 20, 2013, due to a loss of all generator stator cooling water (GC) when the 2A GC pump tripped with the redundant 2B GC pump unavailable due to a previous pump failure on February 17, 2013.

This LER was reviewed. No findings or violations of NRC requirements were identified. Documents reviewed are listed in the Attachment to this report. This LER is closed.

This event follow-up review constituted one inspection sample as defined in IP 71153-05.

#### 4OA5 Other Activities

##### .1 Review of GOTHIC Code Used to Address High Energy Line Break (HELB) Concerns

###### a. Inspection Scope

On April 3, 2013, inspectors from Region III and Nuclear Reactor Regulation (NRR) conducted a review of the GOTHIC Code that was used by the licensee to address HELB concerns at the licensee's corporate office at Cantera.

###### b. Findings

No findings were identified.

#### 4OA6 Management Meetings

##### .1 Exit Meeting Summary

On July 12, 2013, the inspectors presented the inspection results to Mr. B. Youman, Byron Plant Manager, 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. Proprietary material received during the inspection was returned to the licensee.

##### .2 Interim Exit Meetings

Interim exits were conducted for:

- The results of an inservice inspection with Mr. R. Kearney, Site Vice President, on April 19, 2013; and
- The results of a radiological hazard assessment and exposure controls inspection with Mr. R. Kearney, Site Vice President, on April 19, 2013.

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  
B. Askren, Security Manager  
B. Barton, Radiation Protection Manager  
T. Chalmers, Operations Director  
A. Christianson, Work Control  
D. Coltman, Operations  
A. Corrigan, Regulatory Assurance  
S. Gackstetter, Regulatory Assurance Manager  
E. Hernandez, Engineering Director  
S. Kerr, Training Manager  
R. Lloyd, Regulatory Assurance  
J. Pitman, Maintenance  
L. Zurawski, Regulatory Assurance

#### Nuclear Regulatory Commission

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

#### Illinois Emergency Management Agency (IEMA)

R. Zuffa, IEMA  
C. Thompson, IEMA

### LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

#### Opened

50-455/2013003-01	NCV	Inaccurate Risk Assessment (Section 1R13.1)
50-455/2013003-02	NCV	Failure to Establish a Procedure to Control the Spent Fuel Pool Cooling System (Section 1R20.1)

#### Closed

50-455/2013003-01	NCV	Inaccurate Risk Assessment (Section 1R13.1)
50-455/2013003-02	NCV	Failure to Establish a Procedure to Control the Spent Fuel Pool Cooling System (Section 1R20.1)
50-455/2013-001-00	LER	Unit 2 Manual Reactor Trip Due to Loss of Main Generator Stator Cooling Water (Section 4OA3.1)

## LIST OF DOCUMENTS REVIEWED

The following is a partial list of documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspector 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

- WO 1606772: 2C FW Pump 'A' Oil Pump Thermal Overload; May 3, 2013
- ENV-1: Adverse Weather Conditions Unit 0; Revision 112
- ENV-1: Adverse Weather Conditions Unit 1; Revision 101
- ENV-1: Adverse Weather Conditions Unit 2; Revision 101
- IR 1524272: Transformer Areas Housekeeping Walkdown, Day in the Plant; June 11, 2013
- IR 1524261: OBOA Env 1 Executed for Tornado Watch Issued for Ogle County; June 12, 2013
- IR 1526758: NOS ID - Summer Readiness Concerns; June 19, 2013
- IR 1526681: OBOA ENV-1 Needs Revised; June 19, 2013
- IR 1526451: NRC ID Degraded Protected Area Yard Drains; June 18, 2013
- IR 1509967: 2013 Summer Environmental Check-in Gaps; May 3, 2013
- WC-AA-107: Summer Seasonal Readiness; June 1 through August 31, 2013
- OP-AA-106-101; Significant Event Reporting, Revision 15
- OP-AA-108-107-1001; Station Response to Grid Capacity Conditions, Revision 4
- OP-AA-108-107-1002; Interface Procedure between ComEd/PECO and Exelon Generation (Nuclear / Power) for Transmission Operations, Revision 7
- WC-AA-107; Seasonal Readiness, Revision 11
- OBOA ELEC-1; Degraded Switchyard Voltage Unit 0, Revision 11
- SPOG 1-3; Generating Station Stability, Revision 5
- SPOG 1-3-F; Byron Station Stability Trip Schemes, Revision 6
- Alarm Response Procedures for the Following Alarms: 0-35-D1, 0-35-D2, 0-35-E3, 1-19-B6, 1-19-B8, 1-19-D4, Revision (Various)
- IR 1520407: Hot Weather Surveillance Not Complete; June 2, 2013
- Review of IRs for the DG System January 2012 thru May 2013
- Review of IRs for the SY System January 2012 thru May 2013

### Section 1R04

- BOP VP-5: Reactor Containment Fan Cooler Startup; Revision 4
- BOP VP-E2A: Primary Containment Ventilation, Train 'A' Electrical Lineup; Revision 2
- BOP VP-E2B: Primary Containment Ventilation, Train 'B' Electrical Lineup; Revision 2
- BOP SI-1: Safety Injection System Startup; Revision 12
- BOP SI-E2: Safety Injection System Electrical Lineup; Revision 8
- BOP SI-M2: Safety Injection System Valve Lineup; Revision 17
- BOP SI-M2C: Safety Injection System Valve Lineup; Revision 10

### Section 1R05

- Byron Station IPEEE Submittal Report; January 8, 2001
- Section 1R06
- IR 1509178: NRC Identified Water in Safety-Related Cable Vault 0B2; May 1, 2013

- IR 1075842: Manhole 0B2 (SX Tower SW Room) Inspection; May 25, 2010
- IR 1254093: Change PM Frequency of the Inspection; September 23, 2011
- IR 1102966: 2010 Non-Safety Related Manhole 1M1V Inspection; August 11, 2010
- IR 1328236: Safety-Related Manhole 0A1 Inspection – Repair; February 17, 2012
- IR 1075837: Manhole 0A1 (SX Tower NE Room) Inspection; May 25, 2010
- IR 1328244: Safety-Related Manhole 0B2 Inspection – Repair; February 17, 2012
- IR 1254093: 2011 Safety-Related Manhole 0B2 Inspection; August 9, 2011
- IR 1328244: Safety-Related Manhole 0B2 Inspection – Repair; February 17, 2012
- IR 1509178: NRC-Identified Water in Safety-Related Cable Vault 0B2; May 1, 2013

#### Section 1R07

- BB-Rank-003: Byron/Braidwood PRA Model BB011b Heat Exchanger Risk Ranking; Revision 2
- WO 1480643: 2AF01AB – HX Inspection Per Generic Letter 89-13; April 17, 2013
- WO 1480644: 2AF02A – HX Inspection Per Generic Letter 89-13; April 17, 2013

#### Section 1R08

- IR 01414408: NDE Radiography Identifies Rejectable Indications in Weld; September 17, 2012
- IR 01423851: U2 AF VT-2 Inspection Needs Rescheduling; October 8, 2012
- IR 01316967: UT Thickness Results of Lines 2SX26AB-10” and 2SX27DB-10”; January 23, 2012
- EXE-PDI-UT-1; Ultrasonic Examination of Ferritic Pipe Welds in Accordance with PDI-UT-1; Revision 6
- ER-AA-335-002; Liquid Penetrant Examination; Revision 5
- ER-AA-335-003; Magnetic Particle (MT) Examination; Revision 5
- ER-AA-335-015; VT-2 Visual Examination; Revision 10
- ER-AA-335-1008; Code Acceptance and Recording Criteria for Nondestructive (NDE) Surface Examination; Revision 2
- ER-AP-335-001; Bare Metal Visual Examination for Alloy 600/82/182 Materials; Revision 3
- WPS 8-8-GTSM; ASME Welding Procedure Specification Record (QW-482) WPS 8-8-GTSM; Revision 3
- ER-AP-331-1001; Boric Acid Corrosion Control (BACC) Inspection Locations, Implementation and Inspection Guidelines; Revision 7
- ER-AP-331-1002; Boric Acid Corrosion Control Program Identification, Assessment, and Evaluation; Revision 8
- ER-AP-331-1004; Boric Acid Corrosion Control (BACC) Training and Qualification; Revision 5

#### Section 1R11

- Out of the Box Scenario; June 11, 2013

#### Section 1R12

- IR 1476485: 2B GC Pump Degraded, Required Swapping Pumps; February 17, 2013
- IR 1490320: 2A GC Pump Tripped; March 20, 2013
- IR 1490843: 2A GC Pump Refurbished Motor Bearings Do Not Match Nameplate; March 21, 2013
- IR 1491365: 2A GC Motor Failure Related Issues; March 21, 2013

- IR 1491394: 2A GC Pump Abnormal Oil Sample Result Following Motor Failure; March 22, 2013
- IR 1491408: GC Motor Extent of Condition; March 22, 2013
- IR 1492759: Extent of Condition Review for 2B GC Motor; March 25, 2013
- IR 1493080: Increasing Trend of Vibrations on the 2B GC Motor; March 26, 2013
- IR 1502298: Extent of Condition Review for 1B GC Motor; April 15, 2013
- IR 1502301: Extent of Condition Review for 1A GC Motor; April 15, 2013
- IR 1510183: GC System Fill During B2R17; May 3, 2013
- IR 1512660: Maintenance Rule EMR Rule Database IR Review Documentation Issues; May 10, 2013
- IR 1522293: Expedite Work Orders to Replace OD Check Valve O-Rings; June 6, 2013
- IR 1523418: DO Check Valves are a Flooding Concern for DOST's; June 10, 2013

### Section 1R13

- IR 1519964: 2B and 2D RCFC Fans On-Line Risk Not Communicated; May 31, 2013
- WC-AA-104: Integrated Risk Management, Revision 20
- WC-BY-101-1006: On-Line Risk Management and Assessment; Revision 1
- Risk Sheets for Week of May 27, Revision 2 and Revision 3

### Section 1R15

- IR 1368220: CDBI ESF MCC Contactors Not Tested at Assumed Pickup Voltage; May 18, 2012
- OE 12-006, Revision 2: Westinghouse NEMA Size 1 and Size 2 Contactor Pick-up Voltage Concerns (U1/U2) (EC 389469); June 11, 2012
- IR1520514: Question on Status of 0F SXCT Cell; June 2, 2013
- IR 1490153: NRC/IEMA 1A DG HELB Mod Walkdown; March 20, 2013
- LS-AA-104-1000, Revision 7: 50.59 Resource Manual
- EC 390444: Op Eval 13-007 MSIV Accumulator Heatup Concern; April 3, 2013
- IR 1409899: Temperature Effects on MSIV Hydraulics; September 06, 2012
- EC 393497: Op Eval 13-003 1B DG Cylinder Head Possible Oil Accumulation; April 29, 2013
- IR 1505946: Part 21 Report – ESI Refurbished Emergency Diesel Generator; April 24, 2013
- EC 392996: Op Eval 13-002 Unit 1 Diesel Generator Rolling Steel Door Reports; Revision 0
- IR 227277: Void Identified in SX Cooling Tower Fill Support Beam; June 9, 2004
- IR 1520514: Question on Status of SX Cooling Tower Cell 0F; June 2, 2013
- EC 393860: Install Temporary Shoring in the SX CT Cell 0F to Facilitate Concrete Repair Activities; Revision 0

### Section 1R18

- EC 394171: Installation of a Temporary Pump to Fill the 2D SI Accumulator; Revision 0
- Drawing M-136: Diagram of Safety Injection, Sheet 6; Revision AJ
- Drawing M-136: Diagram of Safety Injection, Sheet 1; Revision BA
- BOP SI-222: Raising 2D SI Accumulator Level in Mode 1, 2 or 3; Revision 0

### Section 1R19

- WO 1546512: Install HELB Dampers and High Temperature Thermal Links; April 15, 2013
- IR 1504081: HELB LL-2B DG Vent System HELB Testing Lessons Learned; April 19, 2013
- WO 1478707: Train B – ESF Sequencer Test – TSRA Relay; April 11, 2013

- WO 1478707: Train B – ESF Sequencer Test – TSRB Relay; April 16, 2013
- WO 1481100: 2B Diesel Generator Sequencer Test; April 13, 2013
- 2BOSR 8.1.11-2: Unit 2 Train B Diesel Generator Sequencer Test 18 Month; Revision 14
- IR 1500984: 2B DG Shutdown Earlier than Desired during Sequence Test; April 12, 2013
- EC 393317: Diesel Generator Sequence Testing Criteria; Revision 0
- 2BOSR 8.1.11-2: Unit 2 Train B Diesel Generator Sequencer Test 18 Month; Revision 15
- IR 1500993: 2B DG Sequencer Times Acceptance Criteria Not Met; April 12, 2013
- IR 1505898: 2A DG Governor Linkage Needs to be Adjusted; April 24, 2013
- IR 2A DG Frequency Did Not Respond As Expected; April 23, 2013
- MA-AA-716-004: Attachment 1, Troubleshooting Log; April 19, 2013
- WO 1178700: Replace Governor Actuator; April 24, 2013
- BMP 3108-10: Emergency Stand-By Diesel Generator Governor (Electric-Hydraulic and Overspeed) Replacement; Revision 4
- WO 1344064: Increase Qtr Turn Gear Box to H3BC EC 382598; May 17, 2013
- WO 1492780: Ops PMT Functional Test 0SX163B; May 17, 2013
- 0BOSR 0.5-3.SX.1-4: Test of the Unit 0 Essential Service Water Bypass and Riser Valves Cooling Tower; Revision 4
- EC 382598: MOV Mod - Increase Qtr Turn Gearbox to Size H3Bc on 0SX163B; Revision 0 and Revision 1
- WO 1503270-11:OPS PMT-2CV8116 MSO Perform Position Indication Test; April 23, 2013
- EL 387066: Multiple Spurious Operation-Scenario 51A, Revision 5.00

#### Section 1R20

- IR 1500558: NRC Id'd Issues During Mode 6 Containment Walkdown; April 11, 2013
- IR 1500551: B2R17 LL – ECCS Containment Recirc Sump FME Covers; April 11, 2013
- IR 1498821: NRC Questions Staging Equipment in CNMT in Mode 3 and 4; April 8, 2013
- IR 1503774: Dry Packing Leakage 2PT-RC012; April 18, 2013
- IR 1507571: Loose Debris Identified on NRC Pre-Mode 3 Walkdown B2R17; April 28, 2013
- IR 1506862: SFP Level Reduced; April 26, 2013
- IR 1507574: Wireless Electronic Dosimeter Left Installed on PZR B2R17; April 28, 2013
- IR 1507763: NRC Mode 3 Walkdown; April 29, 2013
- IR 1507763: NRC Mode 3 Walkdown; April 28, 2013
- IR 1503177: ECCS Sump FME Tarps Knocked Off Sump Screens; April 17, 2013
- IR 1500074: B2R17 – Scaffold Dose Overage; April 9, 2013
- IR 1500105: B2R17 – Painters Dose Overage; April 9, 2013
- IR 1499833: 2FP5116 Danger Tagged in the Wrong Position; April 10, 2013
- Memorandum: B2R17 Post-Refuel (Startup), Mode 3 Walkdown, Team Roster and Miscellaneous Special Required; April 26, 2013
- IR 1511806: 4.0 Critique 2B SI PP Run RTS With Disch Isol Vlv Closed; April 21, 2013
- B2R17 SDR SSRB: Bus 241/Core Reload/2A DG Override
- B2R17 SDR SSRB: Bus 241/Core Reload
- B2R17 Shutdown Risk Profile SSRB; February 13, 2013
- OU-AA-103: B2R17 Shutdown Safety Contingency Plan; Revision 12
- OU-AA-103: Shutdown Safety Approval/Notification Form; February 14, 2013
- Independent Review of the B2R17 Shutdown Safety Plan; March 7, 2013
- IR 1516724: B2R18 LL - Mode 4 Entry and Containment Cleanliness; May 22, 2013

## Section 1R22

- Byron Procedure 2BOSR 6.1.1-22, Revision 6, Primary Containment Type C Local Leak Rate Tests and IST Tests of Safety Injection System
- Byron Procedure BOP LLRT-1B, Revision 6, Local Leak Rate Graffel/Chell Flowbox Test Device Operation
- Byron Drawing M-136, Sheet 6, Revision AJ, Diagram of Safety Injection
- Byron Drawing M-136, Sheet 3, Revision AO, Diagram of Safety Injection
- 2BOSR 8.1.17.2; Unit Two 2B Diesel Generator SI Signal Override Test; Revision 16
- IR 1500815: Data Not Captured during 2BOSR 8.1.17-2; April 11, 2013
- 2BOSR 4.11.3-1: Unit 2 Pressurizer PORV Accumulator Pressure Decay Test; Revision 5
- 2BOSR 4.11.3-1: Unit 2 Pressurizer PORV Accumulator Pressure Decay Test; Revision 7
- IR 1505379: 2RY32MA Failed 2BOSR 4.1.11.3-1; April 23, 2013
- 1BOSR 0.5-2.AF.1-1: Unit 1 Train A Auxiliary Feedwater Valves Stroke Test; Revision 6
- IR 1525953: 1AF005A Stroke Time Test Not as Expected, June 17, 2013
- WO 1487770-01: Unit 2 Comprehensive Inservice Testing Requirements for Centrifugal Charging Pump (2CV01PB); April 23, 2013
- WO 1602517-01: Train 'a' Solid State Protection System Surveillance; April 24, 2013
- WO 1480551-01: SSPS Plant Shutdown Protection Condition Exit Procedure; April 24, 2013
- WO 1498187-01: 211 'A' Train 125V Battery Bank 5-Yr Capacity Test; April 24, 2013

## Section 2RS1

- B2R17 Forced Oxidation Plan With Alternate Shutdown Template; Date Not Provided
- Radiation Work Permit and Associated ALARA File; RWP 10014063; MSIP Insulation Activities
- Radiation Work Permit and Associated ALARA File; RWP 10014064; MSIP Process/External Measurements/Testing
- Radiation Work Permit and Associated ALARA File; RWP 10014034; 2SI8900 A/B/C/D Repairs/Replacements
- Radiation Work Permit and Associated ALARA File; RWP 10014073; Spent Filter Replacement with a Boroscope Reading of <7.2 rem/hr and All Associated Activities
- RPP-AA-210: Dosimetry Issue, Usage, and Control; Revision 22
- RPP-AA-350: Personnel Contamination Monitoring, Decontamination and Reporting; Revision 10
- RP-AA-503: Unconditional Release Survey Method; Revision 5

## Section 4OA2

- IR 1502138: 1BOSR 3.2.8-632A Failed ESF Relay Surveillance; April 15, 2013
- IR 1504130: Review of EP Effects from Local Flooding; April 19, 2013
- IR 1500983: Bus 242 UV Relay Contact 2-3 Failed; April 12, 2013
- IR 1500983: Bus 242 UV Relay Contact 2-3 Failed; April 12, 2013
- IR 1505379: 2RY32MA Failed 2BOSR 4.11.3-1; April 23, 2013
- IR 1502712: Potentially Faulty VD High Pressure D/P Switch 1PDS-VD044; April 16, 2013
- IR 1500983: Bus 242 UV Relay Contact 2-3 Failed; April 12, 2013
- IR 1502138: 1BOSR 3.2.8-632A Failed ESF Relay Surveillance; April 15, 2013
- IR 1500835: Need to Determine EOC of Unit 2 RCFC Motor Terminations (2D); April 11, 2013
- IR 1500834: Need to Determine EOC of Unit 2 RCFC Motor Terminations (2B); April 11, 2013
- IR 1500832: Need to Determine EOC of Unit 2 RCFC Motor Terminations (2A); April 11, 2013
- IR 1505287: MS Instrument Hoses Missed QV Hold Points; April 22, 2013



- IR 1500223: 'S' Hook Used on 1VE07Y Replacement Damper; April 10, 2013
- BAP 1310-10, Revision 12: HU-AA-104-101, Procedure Use and Adherence, Byron Addendum
- WO 01481169: As Found LLRT for P-57 – 2FC009 and 2FC010; March 14, 2013
- WO 01481170: As Found LLRT for P-32 – 2FC011 and 2FC012; March 16, 2013
- BOP FC-1: Fuel Pool Cooling System Startup and SFP Purification System Operation; Revision 22
- BOP FC-T2: FC System One-Line Diagram; Revision 2
- OP-AA-108-101: Control of Equipment and System Status; Revision 10
- HU-AA-104-101: Procedure Use and Adherence; Revision 4
- LS-AA-117-1002: Typical Licensing and Regulatory Affairs Correspondence Concurrence Form; 2009-003
- LS-AA-117-1002: Typical Licensing and Regulatory Affairs Correspondence Concurrence Form; 2010-041
- LS-AA-117-1002: Typical Licensing and Regulatory Affairs Correspondence Concurrence Form; 2012-001
- WCAP-11386: Byron/Braidwood T Hot Reduction Final Licensing Report; Revision 2

Corrective Action Documents As a Result of NRC Inspection

- IR 1529409: UFSAR Clarification Needed for T Hot Reduction; June 26, 2013

## LIST OF ACRONYMS USED

AC	Alternating Current
ADAMS	Agencywide Document Access Management System
ASME	American Society of Mechanical Engineers
CAP	Corrective Action Program
CDF	Core Damage Frequency
CFR	Code of Federal Regulations
DC	Direct Current
DG	Emergency Diesel Generator
DOST	Diesel Oil Storage Tank
EO	Equipment Operator
FC	Fuel Pool Cooling System
GC	Generator Stator Water Cooling
HELB	High Energy Line Break
ICDPD	Incremental Core Damage Probability Deficit
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Inspection Report/Issue Report
ISI	Inservice Inspection
IST	Inservice Testing
LCO	Limiting Condition for Operation
LER	Licensee Event Report
LERF	Large Early Release Frequency
LLRT	Local Leak Rate Testing
MSIP	Mechanical Stress Improvement Program
MSIV	Main Steam Isolation Valve
MT	Magnetic Particle
NCV	Non-Cited Violation
NRC	U.S. Nuclear Regulatory Commission
OLR	On-Line Risk
OSP	Outage Safety Plan
PARS	Publicly Available Records System
PI	Performance Indicator
PORV	Power-Operated Relief Valve
PT	Liquid Dye Penetrant
PWSCC	Primary Water Stress Corrosion Cracking
RCFC	Reactor Containment Fan Cooler
RETS	Radiological Effluent Technical Specification
RFO	Refueling Outage
RMA	Risk Management Action
RPV	Reactor Pressure Vessel
RWP	Radiation Work Permit
SDP	Significance Determination Process
SFP	Spent Fuel Pool
SG	Steam Generator
SRA	Senior Reactor Analyst
SSC	Structure, System, or Component
SX	Essential Service Water
SY	Switchyard
TS	Technical Specification

TSO	Transmission System Operator
UFSAR	Updated Final Safety Analysis Report
UT	Ultrasonic Testing
WEC	Work Execution Center
WO	Work Order
WR	Work Request

M. Pacilio

-2-

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Sincerely,

*/RA/*

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

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

Enclosure: Inspection Report 05000454/2013003 and 05000455/2013003  
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Letter to M. Pacilio from E. Duncan dated August 1, 2013

SUBJECT: BYRON STATION, UNITS 1 AND 2, NRC INTEGRATED INSPECTION  
REPORT 05000454/2013003; 05000455/2013003

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