



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

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

February 5, 2013

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

**SUBJECT: BYRON STATION, UNITS 1 AND 2, NRC INTEGRATED INSPECTION  
REPORT 05000454/2012005; 05000455/2012005**

Dear Mr. Pacilio:

On December 31, 2012, the U.S. Nuclear Regulatory Commission (NRC) completed an integrated inspection at your Byron Station, Units 1 and 2. The enclosed inspection report documents the inspection findings which were discussed at an exit meeting on January 7, 2012, with Mr. T. Tulon and other members of your staff.

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

Based on the results of this inspection, two self-revealed findings of very low safety significance (Green) were identified during this inspection. These findings were determined to involve violations of NRC requirements. Additionally, the NRC has determined that a traditional enforcement Severity Level IV violation occurred. However, because of their very low safety significance, and because these 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 subject or severity of an NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy to the Regional Administrator, U.S. Nuclear Regulatory Commission - Region III, 2443 Warrenville Road, Suite 210, Lisle, IL 60532-4352; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the Resident Inspector Office at the Byron Station.

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 Resident Inspector Office at the Byron Station.

M. Pacilio

-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 (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 and NPF-66

Enclosure: Inspection Report No. 05000454/2012005; 05000455/2012005;  
w/Attachment: Supplemental Information

cc w/encl: Distribution via ListServ

U. S. NUCLEAR REGULATORY COMMISSION

REGION III

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

Report No: 05000454/2012005; 05000455/2012005

Licensee: Exelon Generation Company, LLC

Facility: Byron Station, Units 1 and 2

Location: Byron, IL

Dates: October 1, 2012, through December 31, 2012

Inspectors: B. Bartlett, Senior Resident Inspector  
J. Robbins, Resident Inspector  
N. Feliz Adorno, Reactor Engineer  
J. Gilliam, Reactor Engineer  
T. Go, Senior Health Physicist  
J. Laughlin, Emergency Preparedness Inspector  
C. Moore, Operator Licensing  
R. Ng, Project Engineer  
E. Sanchez Santiago, Reactor Inspector  
C. Sanders, Reactor Operations Engineer  
A. Shaikh, Reactor Inspector  
C. St. Peters, Project Manager (NSPDP)  
R. Walton, Operator Licensing, Lead Inspector  
T. Daun, Reactor Engineer

C. Thompson, Resident Inspector, Illinois Emergency  
Management Agency

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

Enclosure

## TABLE OF CONTENTS

SUMMARY OF FINDINGS.....	1
REPORT DETAILS.....	4
Summary of Plant Status.....	4
1. REACTOR SAFETY.....	4
1R01 Adverse Weather Protection (71111.01).....	4
1R04 Equipment Alignment (71111.04).....	7
1R05 Fire Protection (71111.05).....	8
1R07 Annual Heat Sink Performance (71111.07).....	9
1R11 Licensed Operator Requalification Program (71111.11).....	9
1R12 Maintenance Effectiveness (71111.12).....	13
1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13).....	13
1R15 Operability Evaluations (71111.15).....	14
1R18 Plant Modifications (71111.18).....	19
1R19 Post Maintenance Testing (71111.19).....	19
1R20 Outage Activities (71111.20).....	20
1R22 Surveillance Testing (71111.22).....	21
1EP4 Emergency Action Level and Emergency Plan Changes (IP 71114.04).....	22
1EP6 Drill Evaluation (71114.06).....	23
2. RADIATION SAFETY.....	23
2RS8 Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation (71124.08).....	23
4. OTHER ACTIVITIES.....	28
4OA1 Performance Indicator Verification (71151).....	28
4OA2 Identification and Resolution of Problems (71152).....	36
4OA3 Follow-Up of Events and Notices of Enforcement Discretion (71153).....	38
4OA5 Other Activities.....	39
4OA6 Management Meetings.....	42
SUPPLEMENTAL INFORMATION.....	1
Key Points of Contact.....	1
List of Items Opened, Closed, and Discussed.....	2
List of Documents Reviewed.....	3
List of Acronymns Used.....	14

## SUMMARY OF FINDINGS

Inspection Report (IR) 05000454/2012005 and 05000455/2012005; 10/01/2012 - 12/31/2012; Byron Station, Units 1 & 2; Operability Evaluations; Performance Indicator Verification.

This report covers a 3-month period of inspection by resident inspectors and announced baseline inspections by regional inspectors. Two Green self-revealed findings occurred and one Severity Level IV violation was identified by the inspectors. The findings were considered Non-Cited Violations (NCVs) of NRC regulations. The significance of inspection findings is indicated by their color (Greater than Green, or Green, White, Yellow, Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). 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 June 7, 2012. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process (ROP)," Revision 4, dated December 2006.

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

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

Green. A finding of very low safety significance (Green) and an associated NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was self-revealed when the licensee failed to properly address 1B SI pump oil cooler silting on August 25, 2010, and, as a result, the 1B SI pump oil cooler became blocked by silt and was unable to be supplied with sufficient SX flow during pump testing on September 28, 2012. The licensee entered this issue into their Corrective Action Program (CAP) as IR 1419800. Corrective actions included cleaning the 1B SI pump oil cooler, cleaning the oil cooler approach piping, ensuring the oil cooler outlet valve was fully open, and assessing the oil cooler approach piping for other similar coolers.

The inspectors determined that the performance deficiency was more than minor because it was associated with the Human Performance and Design Control attributes of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e. core damage). Specifically, following an August 25, 2010, discovery of higher than expected silting in the 1B SI pump oil cooler, the licensee failed to adequately consider the presence of low flow velocity areas and revise their work procedure to clean the oil cooler and approach piping. This resulted in silt blockage of the 1B SI pump oil cooler. The inspectors determined that because the finding was not a deficiency affecting the design or qualification of a mitigating structure, system, or component (SSC), was not a loss of the system or function, did not represent an actual loss of function of at least a single train for greater than its Technical Specification (TS) allowed outage time, and did not represent a loss of function of one or more non-TS trains of equipment designated as high safety significance, this finding was of very low safety significance (Green). This finding had a cross-cutting aspect in the CAP component of the Problem Identification and Resolution cross-cutting area because the licensee failed to adequately evaluate the August 25, 2010, as found condition of the lube oil cooler and, as a result, failed to implement appropriate corrective actions [P.1(c)]. (Section 1R15.1.b.1)

Green. A finding of very low safety significance (Green) and an associated NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was self revealed when the 1B SX pump tripped when a motor lug failed as a result of an inadequate motor maintenance procedure. Specifically, Work Order (WO) 525476-02, "Unit 2 ESW [Essential Service Water] Pump 2SX01PB Remove Existing Motor and Install Rebuilt Motor," contained instructions to de-terminate the motor leads to the 1B SX pump motor, but failed to specify the removal of bus bars, which subsequently damaged the motor cables and motor lug during shipment for motor refurbishment. The licensee entered this issue into their CAP as IR 1414688. Corrective actions included replacing the failed motor termination lug, reterminating the remaining two lugs on the 1B SX pump motor, initiating the replacement of lugs on the remaining SX pump motors, adding steps in work instructions to de-terminate motor termination lugs when removing the SX pump motors for preventive maintenance, and checking similar motor leads on other systems for similar issues.

The inspectors determined that the performance deficiency was more than minor because it was associated with the Human Performance and Design Control attributes of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e. core damage). The inspectors determined that because the finding was not a deficiency affecting the design or qualification of a mitigating SSC, was not a loss of the system or function, did not represent an actual loss of function of at least a single train of safety-related equipment for greater than its TS allowed outage time, and did not represent a loss of function of one or more non-TS trains of equipment designated as high safety significance, this finding was of very low safety significance (Green). This finding did not have a cross-cutting aspect as it was not indicative of current licensee performance. (Section 1R15.1.b.2)

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

Severity Level IV. The inspectors identified a Severity Level IV NCV of 10 CFR 50.73(a)(2)(v) when licensee personnel failed to report a condition that resulted in a loss of safety function when both containment area radiation monitors were declared inoperable. Specifically, on May 24, 2011, the licensee identified that when reducing reactor power with the isolation setpoints for containment area radiation monitors 1/2AR11J and 1/2AR12J constant and background radiation levels decreasing, the TS setpoint limit for containment area radiation monitors were exceeded and could have prevented the fulfillment of a safety function to automatically isolate containment. The inspectors determined that although this condition represented a loss of safety function in accordance with the 10 CFR 50.73 reporting requirements and NUREG-1022, "Event Reporting Guidelines: 10 CFR 50.72 and 10 CFR 50.73," Revision 2, the condition was not reported as required. This issue was entered into the licensee's CAP as IR 1463675. Corrective actions included an action to report this event in accordance with NRC requirements.

The inspectors determined that the failure to submit a Licensee Event Report (LER) required by 10 CFR 50.73 for a loss of safety function after both containment area radiation monitors were declared inoperable was a performance deficiency. This violation had the potential to impact the regulatory process based, in part, on the generic communications that 10 CFR 50.72 and 10 CFR 50.73 reports serve, the required

Reactor Oversight Process (ROP) inspection reviews that the NRC performs on all LERs, and the potential impact on licensee performance assessment. The inspectors determined that this issue was a Severity Level IV violation based on Example 9, “The licensee fails to make a report required by 10 CFR 50.72 or 10 CFR 50.73,” and Example 10, “A failure to identify all applicable reporting codes on a Licensee Event Report that may impact the completeness or accuracy of other information (e.g., performance indicator data) submitted to the NRC,” discussed in Section 6.9 of the NRC Enforcement Policy. Because cross-cutting aspects do not apply to traditional enforcement issues, no cross-cutting aspect was assigned to this Severity Level IV violation. (Section 4OA1.5.b)

**B. Licensee-Identified Violations**

None.

## REPORT DETAILS

### Summary of Plant Status

Unit 1 was in a refueling outage at the start of the inspection period and was returned to service on October 8, 2012. The unit remained at full power throughout the remainder of the inspection period.

Unit 2 operated at or near full power throughout most of the inspection period. Due to degraded Natural Draft Cooling Tower (NDCT) performance, Unit 2 made numerous small power reductions. The most significant of these resulted in Unit 2 power being reduced to 89 percent. As winter approached and average outside air temperatures dropped over the inspection period, these power reductions were no longer required.

#### 1. REACTOR SAFETY

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

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

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

##### a. Inspection Scope

The inspectors verified that plant features and procedures for operation and continued availability of offsite and alternate alternating current (AC) power systems during adverse weather were appropriate. The inspectors reviewed the licensee's procedures affecting these areas and the communications protocols between the transmission system operator (TSO) and the plant to verify that the appropriate information was being 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 the plant 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 the plant when the offsite power system was returned to normal.

The inspectors also verified that plant procedures addressed measures to monitor and maintain the availability and reliability of both the offsite AC power systems 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 sufficient to assure the continued operation of the safety-related loads without transferring to the onsite AC power system;



- 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 the plant 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 AC 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. This sample was completed in the second quarter of 2012, but was inadvertently omitted from discussion in NRC Integrated Inspection Report 05000454/2012003; 05000455/2012003.

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 weeks of May 21, 2012, and May 28, 2012.

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. Documents reviewed are listed in the Attachment. The inspectors also reviewed 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. The inspectors' reviews focused specifically on the following plant systems:

- Essential Service Water; and
- Switchyard.

This inspection constituted one seasonal adverse weather sample as defined in IP 71111.01-05. This sample was completed in the second quarter of 2012 but was mis-titled in NRC Integrated Inspection Report 05000454/2012003; 05000455/2012003 as a Readiness for Impending Hot Summer Weather Conditions sample.

b. Findings

No findings were identified.

.3 Winter Seasonal Readiness Preparations

a. Inspection Scope

The inspectors conducted a review of the licensee's preparations for winter conditions to verify that the plant's design features and implementation of procedures were sufficient to protect mitigating systems from the effects of adverse weather. Documentation for selected risk-significant systems was reviewed to ensure that these systems would remain functional when challenged by inclement weather. During the inspection, the inspectors focused on plant-specific design features and the licensee's procedures used to mitigate or respond to adverse weather conditions. Additionally, the inspectors reviewed the UFSAR and performance requirements for systems selected for inspection, and verified that operator actions were appropriate as specified by plant-specific procedures. Cold weather protection, such as heat tracing and area heaters, was verified to be in operation where applicable. The inspectors also reviewed 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. Documents reviewed are listed in the Attachment. The inspectors' reviews focused specifically on the following plant systems due to their risk significance or susceptibility to cold weather issues:

- Fire Protection; and
- Essential Service Water.

This inspection constituted one winter seasonal readiness preparations sample as defined in IP 71111.01-05.

b. Findings

No findings were identified.

.4 Readiness for Impending Adverse Weather Condition – High Wind Conditions

a. Inspection Scope

Since thunderstorms with potential tornados and high winds were forecast in the vicinity of the facility for October 29, 2012, the inspectors reviewed the licensee's overall preparations and protection for the expected weather conditions. On the morning of October 29, 2012, the inspectors walked down the areas around the main transformers, station auxiliary transformers, and unit auxiliary transformers, 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 the site's 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

a missile hazard 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 reviewed a sample of CAP items to verify 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 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 1 Train A Auxiliary Feedwater (AF) while Unit 1 Train B AF was Out of Service for a Surveillance test;
- Unit 2 Train B Diesel Generator while Unit 2 Train A was Out of Service; and
- Unit 2 Train B Residual Heat Removal (RH) System while Unit 2 Train A RH was Out of Service for Planned Maintenance

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 function(s). The inspectors also walked down accessible portions of the systems to verify system components and support equipment were aligned correctly and operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no obvious deficiencies. The inspectors also verified that the licensee had properly identified and resolved equipment alignment problems that could cause initiating events or impact the capability of mitigating systems or barriers and entered them into the CAP with the appropriate significance characterization. Documents reviewed are listed in the Attachment.

This inspection constituted three partial system walkdown samples as defined in IP 71111.04-05.

b. Findings

No findings were identified.

1R05 Fire Protection (71111.05)

.1 Routine Resident Inspector Tours (71111.05Q)

a. Inspection Scope

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

- Unit 1 Division 11 Engineered Safety Feature (ESF) Switchgear Room (Fire Zone 5.2-1);
- Unit 2 Auxiliary Electrical Room (Fire Zone 5.5-2);
- Auxiliary Building General Area 346' Elevation (Fire Zone 11.2-0);
- Safety Injection (SI) Pump 1B Room (Fire Zone 11.3F-1); and
- Auxiliary Building Laundry Room (Fire Zone 11.6C-0).

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

This inspection constituted five quarterly fire protection inspection samples as defined in IP 71111.05-05.

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 1 Train A (1A) Diesel Generator Jacket Water Upper Heat Exchanger and Unit 1 Train B (1B) SI Pump Oil Cooler heat exchanger 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 test conditions and design conditions, and the testing results have appropriately considered test instrumentation inaccuracies and differences. Documents reviewed are listed in the Attachment.

This inspection constituted two annual heat sink performance samples as defined in IP 71111.07-05.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program (71111.11)

.1 Resident Inspector Quarterly Review (71111.11Q)

a. Inspection Scope

On August 21 and August 28, 2012, the inspectors observed a crew of licensed operators in the plant simulator during licensed operator requalification examinations to verify that operator performance was adequate, evaluators were identifying and documenting crew performance problems, and training was being conducted in accordance with licensee procedures. The inspectors evaluated the following areas:

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

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

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

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

b. Findings

No findings were identified.

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

On October 7, 2012, the inspectors observed control room operators during the startup following Unit 1 Refueling Outage (RFO) 18. This was an activity that required heightened awareness and was related to increased risk. The inspectors evaluated the following areas:

- licensed operator performance;
- crew's clarity and formality of communications;
- ability to take timely actions in the conservative direction;
- prioritization, interpretation, and verification of annunciator alarms;
- correct use and implementation of procedures;
- control board manipulations;
- oversight and direction from supervisors; and
- ability to identify and implement appropriate TS actions and Emergency Plan actions and notifications.

The performance in these areas was compared to pre-established operator action expectations, procedural compliance, and task completion requirements. Documents reviewed are listed in the Attachment.

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

b. Findings

No findings were identified.

.3 Biennial Written and Annual Operating Test Results (71111.11A)

a. Inspection Scope

The inspectors reviewed the overall pass/fail results of the Biennial Written Examination, and the Annual Operating Test as administered by the licensee from October 9, 2012, through November 16, 2012, and required by 10 CFR 55.59(a). The results were compared to the thresholds established in Inspection Manual Chapter (IMC) 0609, Appendix I, "Licensed Operator Requalification Significance Determination Process (SDP)," to assess the overall adequacy of the licensee's Licensed Operator Requalification Training (LORT) program to meet the requirements of 10 CFR 55.59.

This inspection constituted one annual licensed operator requalification inspection sample as defined in IP 71111.11A.

b. Findings

No findings were identified.

.4 Biennial Review (71111.11B)

a. Inspection Scope

The following inspection activities were conducted during the week of October 29, 2012, to assess: 1) the effectiveness and adequacy of the facility licensee's implementation and maintenance of its Systems Approach to Training (SAT) based LORT program implemented to satisfy the requirements of 10 CFR 55.59; 2) conformance with the requirements of 10 CFR 55.46 for use of a plant reference simulator to conduct operator licensing examinations and for satisfying experience requirements; and 3) conformance with the operator license conditions specified in 10 CFR 55.53. Documents reviewed are listed in the Attachment.

- Problem Identification and Resolution (10 CFR 55.59(c); SAT Element 5 as Defined in 10 CFR 55.4): The inspectors evaluated the licensee's ability to assess the effectiveness of its LORT program and their ability to implement appropriate corrective actions to maintain its LORT Program up to date. The inspectors reviewed documents related to the plant's operating history and associated responses (e.g., Plant Issues Matrix (PIM) and Plant Performance Review (PPR) reports; recent examination and inspection reports; and Licensee Event Reports (LERs)). The inspectors reviewed the use of feedback from operators, instructors, and supervisors, as well as the use of feedback from plant events and industry experience information. The inspectors reviewed the licensee's quality assurance oversight activities, including licensee training department self-assessment reports.
- Licensee Requalification Examinations (10 CFR 55.59(c); SAT Element 4 as Defined in 10 CFR 55.4): The inspectors reviewed the licensee's program for development and administration of the LORT biennial written examination and annual operating tests to assess the licensee's ability to develop and administer examinations that were acceptable for meeting the requirements of 10 CFR 55.59(a).
  - The inspectors reviewed the methodology used to construct the examination including content, level of difficulty, and general quality of the examination/test materials. The inspectors also assessed the level of examination material duplication from week-to-week for both the operating tests conducted during the current year, as well as the written examinations administered in 2012. The inspectors reviewed a sample of the written examinations and associated answer keys to check for consistency and accuracy.

- The inspectors observed the administration of the annual operating test to assess the licensee's effectiveness in conducting the examinations, including the conduct of pre-examination briefings, evaluations of individual operator and crew performance, and post-examination analysis. The inspectors evaluated the performance of one crew in parallel with the facility evaluators during four dynamic simulator scenarios, and evaluated various licensed crew members concurrently with facility evaluators during the administration of several job performance measures (JPMs).
- The inspectors assessed the adequacy and effectiveness of the remedial training conducted since the last requalification examination and the training planned for the current examination cycle to ensure that the licensee addressed weaknesses in licensed operator or crew performance identified during training and plant operations. The inspectors reviewed remedial training procedures and individual remedial training plans.
- Conformance with Examination Security Requirements (10 CFR 55.49): The inspectors conducted an assessment of the licensee's processes related to examination physical security and integrity (e.g., predictability and bias) to verify compliance with 10 CFR 55.49, "Integrity of Examinations and Tests." The inspectors reviewed the facility licensee's examination security procedure, and observed the implementation of physical security controls (e.g., access restrictions and simulator input/output (I/O) controls) and integrity measures (e.g., security agreements, sampling criteria, bank use, and test item repetition) throughout the inspection period.
- Conformance with Simulator Requirements (10 CFR 55.46): The inspectors assessed the adequacy of the licensee's simulation facility (simulator) for use in operator licensing examinations and for satisfying experience requirements. The inspectors reviewed a sample of simulator performance test records (e.g., transient tests, malfunction tests, scenario based tests, post-event tests, steady state tests, and core performance tests), simulator discrepancies, and the process for ensuring continued assurance of simulator fidelity in accordance with 10 CFR 55.46. The inspectors reviewed and evaluated the discrepancy corrective action process to ensure that simulator fidelity was being maintained. Open simulator discrepancies were reviewed for importance relative to the impact on 10 CFR 55.45 and 55.59 operator actions as well as on nuclear and thermal hydraulic operating characteristics.
- Conformance with Operator License Conditions (10 CFR 55.53): The inspectors reviewed the facility licensee's program for maintaining active operator licenses and to assess compliance with 10 CFR 55.53(e) and (f). The inspectors reviewed the procedural guidance and the process for tracking on-shift hours for licensed operators, and which control room positions were granted watch-standing credit for maintaining active operator licenses. Additionally, medical records for seven licensed operators were reviewed for compliance with 10 CFR 55.53(l).

This inspection constitutes one biennial licensed operator requalification inspection sample as defined in IP 71111.11B.



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:

- 1B SX Pump Failure to Run;
- 1B SI Pump Clogged Oil Cooler; and
- Unit Common Train A (0A) Auxiliary Building Ventilation Fan De-Blade.

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

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

b. Findings

No findings were identified.

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

.1 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

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

- Unit 2 Station Auxiliary Transformers 242-1 and 242-2 Outage to Install Loss of Phase Detection Equipment;
- Work Activities for the Week of November 12, 2012;
- Emergent Failure of River Screen House Air Compressors; and
- Significant Leak from Unit 1 Circulating Water while 2A RH and 0A Control Room Air Conditioning was Out of Service.

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 plant

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

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

b. Findings

No findings were identified.

1R15 Operability Evaluations (71111.15)

.1 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the following issues:

- Unit 2 Offsite Power System Configuration for Compliance with Regulatory Requirements Associated with Delayed Access Circuits;
- Unit 1 and Unit 2 ESF Bus Alive Indicators Due to Performance Characteristics Identified during the Loss of Phase Event;
- Unit 1 Main Generator Hydrogen Leak of 7,300 Standard Cubic Feet Per Day;
- 1B SI Pump Oil Cooler Clogged on the Essential Service Water (SX) Side; and
- Assessment of Questions Raised Regarding Potential Auxiliary Building Flooding through the Fuel Handling Building.

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

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

b. Findings

(1) Failure to Adequately Address Previous High Silt Loading Led to Heat Exchanger Blockage and High Oil Temperature for the 1B Safety Injection Pump

Introduction: A finding of very low safety significance (Green) and an associated NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was self-revealed when licensee personnel failed to properly address 1B SI pump oil cooler silting on August 25, 2010, and, as a result, the 1B SI pump oil cooler became blocked by silt and was unable to be supplied with sufficient SX flow during pump testing on September 28, 2012.

Description: On September 28, 2012, during the Unit 1 refueling outage, the licensee performed routine surveillance testing of the 1B SI pump. As part of the testing activities, the 1B SI pump was operated on recirculation flow. During pump operation, operators observed that 1B SI pump lube oil temperature began to increase above expected values. After about 54 minutes, the pump was secured when pump oil temperature exceeded the maximum allowed temperature of 160°F.

The licensee declared the pump inoperable, determined that neither the lube oil nor the pump was damaged, and initiated an Apparent Cause Evaluation (ACE) to further investigate the event. At the time of the event, Unit 1 was in Cold Shutdown, Mode 5; a mode which did not require that an SI pump be operable.

The licensee determined that the 1B SI pump lube oil cooler tubes were completely blocked with silt on the SX side and therefore that no cooling water from the SX system was available to cool the lube oil. The licensee determined that the oil cooler had last been inspected on August 25, 2010. At that time, the cooler tubes were identified to have been 70 percent blocked with silt, which exceeded the acceptance criterion of 50 percent. At that time, the oil cooler was cleaned and the problem was attributed to high silt loading in the Rock River due to several locally heavy rains. In addition, the inspection frequency of the other three SI pumps were revised from 5 years to 3 years.

The licensee's Generic Letter (GL) 89-13 commitments, as described in corporate procedure ER-AA-340, Revision 6, "GL 89-13 Program Implementing Procedure," required that silting be considered and that instructions be included in work packages for inspecting piping and components for silting. Specifically, ER-AA-340 required, in part, that "If silting is determined to be a concern, consider the use of a silt dispersant and biocide, or maximize flow through the component," and "Based upon inspection results, determine the appropriate corrective actions."

The licensee's ACE following the September 28, 2012 event determined that low flow velocity through the 1B SI pump oil cooler allowed silt to settle out in the oil cooler, and that low flow velocity was not appropriately considered following the August 25, 2010, event. Contributing causes included internal pipe restrictions near the oil cooler approach piping, inlet and outlet valve positions that were not optimal for maximizing flow rate, an oil cooler outlet valve with poor material condition that was not as open as it was thought to be, and a failure to adequately respond to the August 25, 2010, silting event.

This issue was entered into the licensee's CAP as IR 1419800, "Secured 1B SI PP [Pump] During 1BOSR 8.1.11-2 Test Due to High Temp." Licensee corrective actions for the September 28, 2012 event included cleaning the oil cooler, cleaning the approach piping, ensuring the oil cooler outlet valve was fully open, and assessing the approach piping for other similar heat exchangers.

The inspectors reviewed the licensee's ACE, including the licensee's corrective actions and extent of condition review. In addition, the licensee completed Engineering Change (EC) 390906, "Past Operability Evaluation for the 1B SI Pump," to assess past operability. The licensee concluded that although the SX supply to the 1B SI pump oil cooler was completely blocked during the September 28, 2012 event, the 1B SI pump remained capable of performing its intended safety function, and was therefore operable. A risk analysis performed by a Region III Senior Reactor Analyst (SRA) concluded that even if the pump had been inoperable for one year, the overall impact of the unavailability of the pump on plant risk was very low.

Analysis: The inspectors determined that the licensee's failure to adhere to GL 89-13 implementing procedure ER-AA-340, Revision 6, "GL 89-13 Program Implementing Procedure," 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 did not involve a violation that impacted the regulatory process or contribute to actual safety consequences. The inspectors determined that the performance deficiency was more than minor because it was associated with the Human Performance and Design Control attributes of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e. core damage). Specifically, following the August 25, 2010, silting observation, licensee personnel failed to appropriately consider low flow velocity areas as required by GL 89-13 and adequately revise their work procedure to clean the oil cooler and approach piping, which resulted in silt blockage to the 1B SI pump oil cooler on September 28, 2012.

The inspectors evaluated this finding using the SDP in accordance with IMC 0609, Attachment 4, "Initial Characterization of Findings," which directed the finding to be screened using IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings at Power." The inspectors determined that because the finding was not a deficiency affecting the design or qualification of a mitigating SSC, did not represent the loss of a system or system function, did not represent an actual loss of the function of at least a single train for greater than its TS allowed outage time, and did not represent an actual loss of function of one or more non-TS trains of equipment designated as high safety significance in accordance with the licensee's maintenance rule program for greater than 24 hours, this finding was of very low safety significance (Green).

This finding had an associated cross-cutting aspect in the CAP component of the Problem Identification and Resolution cross-cutting area because the licensee failed to adequately evaluate the August 25, 2010, as-found condition of the 1B SI pump lube oil cooler and piping and, as a result, failed to implement appropriate corrective actions [P.1(c)].

Enforcement: 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality shall be prescribed by documented instructions, procedures or drawings of a type appropriate to the circumstance and shall be accomplished in accordance with these instructions, procedures or drawings. Exelon procedure ER-AA-340, Revision 6, "GL 89-13 Program Implementing Procedure," required, in part, that "If silting is determined to be a concern, consider the use of a silt dispersant and biocide, or maximize flow through the component," and "Based upon inspection results, determine the appropriate corrective actions."

Contrary to the above, on August 25, 2010, the licensee failed to adequately consider low flow velocity as a cause of silting of the 1B SI pump lube oil cooler and determine appropriate corrective actions to ensure the 1B SI pump oil cooler remained operable as required by procedure ER-AA-340, Revision 6. Because this violation was of very low safety significance and because this issue was entered into the licensee's CAP as IR 1419800, "Secured 1B SI PP [Pump] During 1BOSR 8.1.11-2 Test Due to High Temp," this violation is being treated as a NCV consistent with Section 2.3.2 of the Enforcement Policy. **(NCV 05000454/2012005-01, Failure to Prevent Excessive Silt Buildup in the 1B Safety Injection Pump Oil Cooler)**

(2) Inadequate Refurbishment Procedure Results in Separation of Motor Leads of the 1B SX Pump

Introduction: A finding of very low safety significance (Green) and an associated NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was self revealed when the 1B SX pump tripped when a motor lug failed as a result of an inadequate motor maintenance procedure.

Description: On September 18, 2012, during a Unit 1 refueling outage, the 1B SX pump tripped unexpectedly after operating for 4 days with no abnormal trends noted.

Following the pump trip, the licensee determined that one of the three-phase motor leads for the SX pump failed at the connection to the bus bar inside of the motor termination box. Following re-termination of the motor lead, the motor was tested and returned to service.

The licensee performed an ACE and determined that the motor lead termination (a crimp) was degraded because the bus bars were not removed prior to shipping the motor to a vendor for refurbishment, and the bus bar weight caused the motor leads to move relative to the crimp, which damaged the leads. As a result, one of the three motor connection leads failed. Contributing causes included the failure of the vendor to perform termination inspections and the failure of the licensee's refurbishment process to ensure vendor performance gaps, including termination inspections, were identified.

The 1B SX pump motor was de-terminated at the site in accordance with safety-related WO 525476-02, "Unit 2 ESW [Essential Service Water] Pump 2SX01PB Remove Existing Motor and Install Rebuilt Motor," in October of 2008. Following vendor refurbishment, the 1B SX pump motor was placed in service in September of 2009 and operated for 3 years with no signs of degradation. In addition, there was no record of an overcurrent or any other service-related condition that would have challenged the motor terminations.

This issue was entered into the licensee's CAP as IR 1414688, "Apparent Cause Report – Equipment; 1B Essential Service Water Pump Tripped Unexpectedly." Corrective actions included replacing the failed motor termination lug, reterminating the remaining two lugs in the 1B SX pump motor, initiating the replacement of lugs on the remaining SX pump motors, adding steps in work instructions to de-terminate motor termination lugs when removing the SX pump motors for preventive maintenance, and checking similar motor leads on other systems for similar issues.

Analysis: The inspectors determined that the licensee's failure to have an adequate procedure for the maintenance of the 1B SX pump 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 did not involve a violation that impacted the regulatory process or contribute to actual safety consequences. The inspectors determined that the performance deficiency was more than minor because it was associated with the Human Performance and Design Control attributes of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences (i.e. core damage). Specifically, WO 525476-02 contained instructions to de-terminate the motor leads to the 1B SX pump motor, but did not specify the removal of the bus bars, which subsequently damaged the motor leads during shipment for refurbishment.

The inspectors evaluated this finding using the SDP in accordance with IMC 0609, Attachment 4, "Initial Characterization of Findings," which directed the finding to be screened using IMC 0609, Appendix A, "The Significance Determination Process (SDP) for Findings at Power." The inspectors determined that because the finding was not a deficiency affecting the design or qualification of a mitigating SSC, did not represent the loss of a system or system function, did not represent an actual loss of the function of at least a single train for greater than its TS allowed outage time, and did not represent an actual loss of function of one or more non-TS trains of equipment designated as high safety significance in accordance with the licensee's maintenance rule program for greater than 24 hours, this finding was of very low safety significance (Green).

This finding did not have an associated cross-cutting aspect as it was not indicative of current licensee performance.

Enforcement: 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality be prescribed by documented instructions, procedures or drawings of a type appropriate to the circumstance and be accomplished in accordance with these instructions, procedures or drawings.

Contrary to the above, on October 15, 2008, the 1B SX pump motor was de-terminated without the bus bars being removed. In particular, Step 3.10 of safety-related WO 525476-02, "Unit 2 ESW Pump 2SX01PB Remove Existing Motor and Install Rebuilt Motor," required that the motor leads for the 1B SX pump be de-terminated, but did not address the bus bars. This resulted in damage during the shipment of the 1B SX pump motor for refurbishment, and resulted in one of the three motor connection phases catastrophically failing during 1B SI pump motor operation on September 18, 2012. Because this violation was of very low safety significance and because this issue was entered into the licensee's CAP as IR 1414688, "Apparent Cause Report – Equipment;

1B Essential Service Water Pump Tripped Unexpectedly," this violation is being treated as a NCV consistent with Section 2.3.2 of the Enforcement Policy.  
**(NCV 05000454/2012005-02, Inadequate Work Instructions Led to the Failure of the 1B SX Pump Motor)**

1R18 Plant Modifications (71111.18)

.1 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed the following temporary modification:

- Unit 1 Core Exit Thermocouple Disconnection/Reconnection Practice

The inspectors compared the temporary configuration changes and associated 10 CFR 50.59 screening and evaluation information against the design basis, the UFSAR, and the TS, to verify that the modification did not affect the operability or availability of the affected system. The inspectors also compared the licensee's information to operating experience information to ensure that lessons learned from other utilities had been incorporated into the licensee's decision to implement the temporary modification. The inspectors, as applicable, performed field verifications to ensure that the modifications were installed as directed; the modifications operated as expected; 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. Lastly, the inspectors discussed the temporary modification with operations, engineering, and training personnel to ensure that the individuals were aware of how extended operation with the temporary 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 testing activities to verify that procedures and test activities were adequate to ensure system operability and functional capability:

- WO 1409332-02, Functional Test of Time Delay Relay for Valve 1RH611;
- 1BOSR 0.5-2.SI.1-2, Stroke Test of RH Valves;
- 0B Diesel Fire Pump Starter Relay Replacement;

- 2D Steam Generator Feedwater Regulating Valve Travel Transducer Replacement; and
- 2A Steam Generator Feedwater Regulating Valve Travel Transducer Replacement.

These activities were selected based upon the SSCs' ability to impact risk. The inspectors evaluated these activities for the following (as applicable): the effect of testing on the plant had been adequately addressed; testing was adequate for the maintenance performed; acceptance criteria were clear and demonstrated operational readiness; test instrumentation was appropriate; tests were performed as written in accordance with properly reviewed and approved procedures; equipment was returned to its operational status following testing (temporary modifications or jumpers required for test performance were properly removed after test completion); and test documentation was properly evaluated. The inspectors evaluated the activities against 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 five post maintenance testing samples as defined in IP 71111.19-05.

b. Findings

No findings were identified.

1R20 Outage Activities (71111.20)

.1 Refueling Outage Activities

a. Inspection Scope

During this inspection period, the inspectors completed refueling outage inspection activities associated with Byron Unit 1 RFO 18 that was begun during the previous inspection period. The refueling outage was completed and Unit 1 was returned to service on October 8, 2012. During the refueling outage, the inspectors observed portions of the heatup and startup processes and monitored licensee controls over the outage activities listed below. Documents reviewed are listed in the Attachment.

- Licensee configuration management, including maintenance of defense-in-depth commensurate with the Outage Safety Plan (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.
- Monitoring of decay heat removal processes, systems, and components.
- Controls to ensure that outage work was not impacting the ability of the operators to operate the spent fuel pool cooling system.



- Reactor water inventory controls including flow paths, configurations, and alternative means for inventory addition, and controls to prevent inventory loss.
- Controls over activities that could affect reactivity.
- Maintenance of secondary containment as required by TS.
- Startup and ascension to full power operation, tracking of startup prerequisites, walkdown of the containment to verify that debris had not been left which could block emergency core cooling system suction strainers, and reactor physics testing.
- Licensee identification and resolution of problems related to refueling outage activities.

This inspection constituted completion of one RFO sample also documented in NRC Inspection Report 05000454/2012004; 05000455/2012004 as defined in IP 71111.20-05.

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22)

.1 Surveillance Testing

a. Inspection Scope

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

- Unit 1 B and D Reactor Containment Fan Cooler SX Inlet and Outlet Isolation Valve Stroke Time Test;
- 2BOSR 4.13.1-1, Unit 2 Reactor Coolant System (RCS) Water Inventory Balance;
- 1A Solid State Protection System Bi-Monthly Surveillance Post Modification;
- 2BOSR 3.2.8-632B, 2B Auxiliary Feedwater Relay Actuation;
- 2B Diesel Generator Monthly Run; and
- 2A Inservice Testing Requirements for Charging Pump 2CV01PA; and
- 1B K610 Engineered Safety Feature Actuation System (ESFAS) Slave Relay Surveillance

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

- did preconditioning occur;
- were the effects of the testing adequately addressed by control room personnel or engineers prior to the commencement of the testing;
- were acceptance criteria clearly stated, 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 and were applicable prerequisites described in the test procedures satisfied;
- did test frequencies meet TS requirements to 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 American Society of Mechanical Engineers (ASME) Code, and were 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 were 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 four routine surveillance testing samples, one RCS Leak Detection, one Inservice Testing (IST) sample, and one containment isolation valve sample as defined in IP 71111.22, Sections -02 and -05.

b. Findings

No findings were identified.

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

a. Inspection Scope

The Nuclear Security and Incident Response headquarters staff performed an in-office review of the latest revisions of the Emergency Plan and various Emergency Plan

Implementing Procedures (EIPs) located under ADAMS Accession Numbers ML12088A343 and ML12192A510 as listed in the Attachment.

The licensee transmitted the EIP revisions to the NRC pursuant to the requirements of 10 CFR Part 50, Appendix E, Section V, "Implementing Procedures." The NRC review was not documented in a Safety Evaluation Report and did not constitute approval of licensee-generated changes; therefore, this revision is subject to future inspection. Documents reviewed are listed in the Attachment.

This inspection constituted one emergency action level and Emergency Plan change sample as defined in IP 71114.04-05.

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 October 16, 2012, 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 sample as defined in IP 71114.06-05.

b. Findings

No findings were identified.

**2. RADIATION SAFETY**

2RS8 Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation (71124.08)

This inspection constituted one complete sample as defined in IP 71124.08-05.

.1 Inspection Planning (02.01)

a. Inspection Scope

The inspectors reviewed the solid radioactive waste system description in the USFAR, the process control program, and the recent radiological effluent release report for information on the types, amounts, and processing of radioactive waste disposed.

The inspectors reviewed the scope of any quality assurance audits in this area since the last inspection to gain insights into the licensee's performance and inform the "smart sampling" inspection planning.

b. Findings

No findings were identified.

.2 Radioactive Material Storage (02.02)

a. Inspection Scope

The inspectors selected areas where containers of radioactive waste are stored, and evaluated whether the containers were labeled in accordance with 10 CFR 20.1904, "Labeling Containers," or controlled in accordance with 10 CFR 20.1905, "Exemptions to Labeling Requirements," as appropriate.

The inspectors assessed whether the radioactive material storage areas were controlled and posted in accordance with the requirements of 10 CFR Part 20, "Standards for Protection Against Radiation." For materials stored or used in controlled or unrestricted areas, the inspectors evaluated whether they were secured against unauthorized removal and controlled in accordance with 10 CFR 20.1801, "Security of Stored Material," and 10 CFR 20.1802, "Control of Material Not in Storage," as appropriate.

The inspectors evaluated whether the licensee established a process for monitoring the impact of long term storage (e.g., buildup of any gases produced by waste decomposition, chemical reactions, container deformation, loss of container integrity, or re-release of free-flowing water) that was sufficient to identify potential unmonitored, unplanned releases or nonconformance with waste disposal requirements.

The inspectors selected containers of stored radioactive material, and inspected these containers for signs of swelling, leakage, and deformation.

b. Findings

No findings were identified.

.3 Radioactive Waste System Walkdown (02.03)

a. Inspection Scope

The inspectors walked down accessible portions of select radioactive waste processing systems to assess whether the current system configuration and operation agreed with the descriptions in the Final Safety Analysis Report (FSAR), Offsite Dose Calculation Manual (ODCM), and process control program.

The inspectors reviewed administrative and/or physical controls (i.e., drainage and isolation of the system from other systems) to assess whether the equipment which was not in service or abandoned in place would contribute to an unmonitored release path and/or affect operating systems or be a source of unnecessary personnel exposure. The inspectors assessed whether the licensee reviewed the safety significance of systems and equipment abandoned in place in accordance with 10 CFR 50.59, "Changes, Tests, and Experiments."

The inspectors reviewed the adequacy of changes made to the radioactive waste processing systems since the last inspection. The inspectors evaluated whether changes from what was described in the FSAR were reviewed and documented in accordance with 10 CFR 50.59, as appropriate, and assessed the impact on radiation dose to members of the public.

The inspectors selected processes for transferring radioactive waste resin and/or sludge discharges into shipping/disposal containers and assessed whether the waste stream mixing, sampling procedures, and methodology for waste concentration averaging were consistent with the process control program, and provided representative samples of the waste product for the purposes of waste classification as described in 10 CFR 61.55, "Waste Classification."

For those systems that provided tank recirculation, the inspectors evaluated whether the tank recirculation procedures provided sufficient mixing.

The inspectors assessed whether the licensee's process control program correctly described the current methods and procedures for dewatering and waste stabilization (e.g., removal of freestanding liquid).

b. Findings

No findings were identified.

.4 Waste Characterization and Classification (02.04)

a. Inspection Scope

The inspectors selected the following radioactive waste streams for review:

- Dry Active Waste (DAW) Waste Stream;
- Primary and Radwaste Filters Waste Stream; and
- Primary and Secondary Resin Waste Stream.

For the waste streams listed above, the inspectors assessed whether the licensee's radiochemical sample analysis results (i.e., "10 CFR Part 61" analysis) were sufficient to support radioactive waste characterization as required by 10 CFR Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste." The inspectors evaluated whether the licensee's use of scaling factors and calculations to account for difficult-to-measure radionuclides was technically sound and based on current 10 CFR Part 61 analysis for the selected radioactive waste streams.

The inspectors evaluated whether changes to plant operational parameters were taken into account to: (1) maintain the validity of the waste stream composition data between

the annual or biennial sample analysis update; and (2) assure that waste shipments continued to meet the requirements of 10 CFR Part 61 for the waste streams selected above.

The inspectors evaluated whether the licensee had established and maintained an adequate quality assurance program to ensure compliance with the waste classification and characterization requirements of 10 CFR 61.55 and 10 CFR 61.56, "Waste Characteristics."

b. Findings

No findings were identified.

.5 Shipment Preparation (02.05)

a. Inspection Scope

The inspectors observed shipment packaging, surveying, labeling, marking, placarding, vehicle checks, emergency instructions, disposal manifest, shipping papers provided to the driver, and licensee verification of shipment readiness. The inspectors assessed whether the requirements of applicable transport cask certificates of compliance had been met. The inspectors evaluated whether the receiving licensee was authorized to receive the shipment packages. The inspectors evaluated whether the licensee's cask loading and closure procedures were consistent with the vendor's current approved procedures.

The inspectors observed radiation workers during the conduct of radioactive waste processing and radioactive material shipment preparation and receipt activities. The inspectors assessed whether the shippers were knowledgeable of the shipping regulations and whether shipping personnel demonstrated adequate skills to accomplish the package preparation requirements for public transport with respect to:

- the licensee's response to NRC Bulletin 79-19, "Packaging of Low-Level Radioactive Waste for Transport and Burial," dated August 10, 1979; and
- 49 CFR Part 172, "Hazardous Materials Table, Special Provisions, Hazardous Materials Communication, Emergency Response Information, Training Requirements, and Security Plans," Subpart H, "Training."

Due to limited opportunities for direct observation, the inspectors reviewed the technical instructions presented to workers during routine training. The inspectors assessed whether the licensee's training program provided training to personnel responsible for the conduct of radioactive waste processing and radioactive material shipment preparation activities.

b. Findings

No findings were identified.

.6 Shipping Records (02.06)

a. Inspection Scope

The inspectors evaluated whether radioactive material shipping documents identified the proper shipper name; emergency response information and a 24-hour contact telephone number; accurate curie content and volume of material; and appropriate waste classification, transport index, and UN number for the following radioactive shipments:

- RMS-12-091; Radioactive Material Shipment; LSA-II, Class 7, UN3321; CRDM [Control Rod Drive Mechanism] Equipment to Westinghouse; September 27, 2012;
- RWS-12-014; Class B Shipment, Radioactive Material, Type B(U) Package, Class 7, UN2916; De-watered Resin Shipment to Waste Control Specialist, Texas; July 24, 2012;
- RWS-12-015; Class B Shipment, Radioactive Material, Type B(U) Package, Class 7, UN2916; De-watered Resin Shipment to Waste Control Specialist, Texas; July 31, 2012; and
- RWS-12-016; Class B Shipment, Radioactive Material, Type B(U) Package, Class 7, UN2916; De-watered Resin Shipment to Waste Control Specialist, Texas; August 7, 2012.

Additionally, the inspectors assessed whether the shipment placard was consistent with the information in the shipping documentation.

b. Findings

No findings were identified.

.7 Identification and Resolution of Problems (02.07)

a. Inspection Scope

The inspectors assessed whether problems associated with radioactive waste processing, handling, storage, and transportation, were being identified by the licensee at an appropriate threshold, were properly characterized, and were properly addressed for resolution in the licensee CAP. Additionally, the inspectors evaluated whether the corrective actions were appropriate for a selected sample of problems documented by the licensee that involved radioactive waste processing, handling, storage, and transportation.

The inspectors reviewed results of selected audits and self-assessments performed since the last inspection of this program and evaluated the adequacy of the licensee's corrective actions for issues identified during those audits and self-assessments.

b. Findings

No findings were identified.

#### 4. OTHER ACTIVITIES

##### 4OA1 Performance Indicator Verification (71151)

###### .1 Unplanned Scrams Per 7000 Critical Hours

###### a. Inspection Scope

The inspectors sampled licensee submittals for the Unplanned Scrams Per 7000 Critical Hours Performance Indicator (PI) for both Unit 1 and Unit 2 for the period from the second quarter 2011 through the first quarter 2012. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in Nuclear Energy Institute (NEI) 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, dated October 2009, were used. The inspectors reviewed the licensee's operator narrative logs, IRs, event reports and NRC Integrated Inspection Reports for the period of April 2011 through March 2012 to validate the accuracy of the submittals. The inspectors also reviewed the licensee's IR database to determine if any problems had been identified with the PI data collected or transmitted for this indicator. Documents reviewed are listed in the Attachment.

This inspection constituted two unplanned scrams per 7000 critical hours samples as defined in IP 71151-05.

###### b. Findings

No findings were identified.

###### .2 Unplanned Scrams with Complications

###### a. Inspection Scope

The inspectors sampled licensee submittals for the Unplanned Scrams with Complications PI for Unit 1 and Unit 2 for the period from the first quarter 2011 through the fourth quarter 2011. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, dated October 2009, were used. The inspectors reviewed the licensee's operator narrative logs, IRs, event reports and NRC Integrated Inspection Reports for the period of January 2011 through December 2011 to validate the accuracy of the submittals. The inspectors also reviewed the licensee's IR database to determine if any problems had been identified with the PI data collected or transmitted for this indicator. Documents reviewed are listed in the Attachment.

This inspection constituted two unplanned scrams with complications samples as defined in IP 71151-05.

###### b. Findings

No findings were identified.



.3 Unplanned Transients Per 7000 Critical Hours

a. Inspection Scope

The inspectors sampled licensee submittals for the Unplanned Transients Per 7000 Critical Hours PI for Unit 1 and Unit 2 for the period from the first quarter 2011 through the fourth quarter of 2011. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, dated October 2009, were used. The inspectors reviewed the licensee's operator narrative logs, IRs, maintenance rule records, event reports, and NRC Integrated Inspection Reports for the period of January 2011 through December 2011 to validate the accuracy of the submittals. The inspectors also reviewed the licensee's IR database to determine if any problems had been identified with the PI data collected or transmitted for this indicator. Documents reviewed are listed in the Attachment.

This inspection constituted two unplanned transients per 7000 critical hours samples as defined in IP 71151-05.

b. Findings

No findings were identified.

.4 Reactor Coolant System Specific Activity

a. Inspection Scope

The inspectors sampled licensee submittals for the RCS Specific Activity PI for Unit 1 and Unit 2 for the period from the fourth quarter 2011 through the third quarter 2012. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, dated October 2009, were used. The inspectors reviewed the licensee's RCS chemistry samples, TS requirements, IRs, event reports and NRC Integrated Inspection Reports for the period of October 2011 through September 2012 to validate the accuracy of the submittals. The inspectors also reviewed the licensee's IR database to determine if any problems had been identified with the PI data collected or transmitted for this indicator. In addition to record reviews, the inspectors observed a chemistry technician obtain and analyze a RCS sample. Documents reviewed are listed in the Attachment.

This inspection constituted two reactor coolant system specific activity samples as defined in IP 71151-05.

b. Findings

No findings were identified.

.5 Safety System Functional Failures

a. Inspection Scope

The inspectors sampled licensee submittals for the Safety System Functional Failures PI for the period from the third quarter 2011 through the third quarter 2012. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, dated October 2009, and NUREG-1022, "Event Reporting Guidelines 10 CFR 50.72 and 50.73," were used. The inspectors reviewed the licensee's operator narrative logs, operability assessments, maintenance rule records, maintenance work WOs, IRs, event reports and NRC Integrated Inspection Reports for the period of October 2011 through September 2012, to validate the accuracy of the submittals. The inspectors also reviewed the licensee's IR database to determine if any problems had been identified with the PI data collected or transmitted for this indicator. Documents reviewed are listed in the Attachment.

This inspection constituted two safety system functional failures samples as defined in IP 71151-05.

b. Findings

Failure to Submit a 10 CFR 50.73(a)(2)(v) Report for Inoperable Containment Radiation Monitors

Introduction: The inspectors identified a Severity Level IV NCV of 10 CFR 50.73(a)(2)(v) when licensee personnel failed to report a condition that resulted in a loss of safety function when both containment area radiation monitors were declared inoperable. Specifically, on May 24, 2011, the licensee identified that when reducing reactor power with the containment area radiation monitor setpoint constant and background radiation levels decreasing, the TS setpoint limit for containment area radiation monitors 1/2AR11J and 1/2AR12J were exceeded and could have prevented the fulfillment of a safety function to automatically isolate containment. The inspectors determined that although this condition represented a loss of safety function in accordance with 10 CFR 50.73 reporting requirements and NUREG-1022, "Event Reporting Guidelines: 10 CFR 50.72 and 10 CFR 50.73," Revision 2, the condition was not reported as required.

Description: Containment area radiation monitors 1/2AR11J and 1/2AR12J were required by TS 3.3.6, "Containment Ventilation Isolation Instrumentation," to provide input to the containment ventilation isolation function. In particular, a high radiation signal from 1/2AR11J and 1/2AR12J was designed to initiate a containment ventilation isolation to minimize the release of radioactivity following an accident. Prior to May 2011, the procedural controls for revising the setpoints for the 1/2AR011J and 1/2AR012J monitoring channels did not account for the lowering background radiation levels that occurred when reactor power was being reduced. During a power reduction, with the setpoint constant and near its limit and background levels decreasing, the TS setpoint limit of being less than or equal to 10 millirem per hour (mR/hr) above background would be exceeded. On May 24, 2011, the flawed procedural setpoint practice was recognized during a shutdown for a Unit 2 maintenance outage. The

licensee entered this issue into their CAP as IR 1463675 and concluded that the issue was not reportable.

On June 4, 2012, Braidwood Station notified the licensee that they considered a similar condition at their site as a condition reportable to the NRC. Byron also subsequently concluded that the condition was prohibited by the plant's TSs and was reportable.

On August 3, 2012, the licensee submitted LER 2012-003-00, "Containment Area Radiation Monitors Inoperable for Longer Than Allowed by Technical Specifications Due to Inadequate Procedure Controls," in accordance with 10 CFR 50.73(a)(2)(i)(B) as an operation or condition prohibited by the plant's TSs. However, the licensee concluded that although the setpoints were higher than prescribed by the TSs, containment ventilation isolation would have occurred with a delay, but prior to offsite dose limits, as defined in the ODCM being challenged or exceeding the TS instantaneous effluent release dose rate limits. Specifically, the un-assessed dose was determined to be less than 10 percent of the 10 CFR 50, Appendix I, design objectives. As a result, the licensee did not report this event as a condition that as a result of a single cause could have prevented the fulfillment of a safety function needed to isolate containment. It was also determined that this condition existed since initial startup.

The inspectors reviewed LER 2012-003-00 and reporting guidance contained in NUREG-1022, Revision 2, and discussed the issue with the NRC Nuclear Reactor Regulation (NRR) subject matter expert. The inspectors determined that this event represented a condition that as a result of a single cause could have prevented the fulfillment of a safety function needed to isolate containment. Specifically, both containment area radiation monitors were inoperable with non-conservative setpoints to isolate containment ventilation.

The NRC guidance document for 10 CFR 50.73 is contained in NUREG-1022, "Event Reporting Guidelines: 10 CFR 50.72 and 50.73," Revision 2. Section 3.2.7 of NUREG-1022 stated the following:

- *Reportable conditions under these criteria include the following...Whenever an event or condition exists where the system could have been prevented from fulfilling its safety function because of one or more reasons for equipment inoperability or unavailability, it is reportable under these criteria. This would include cases where one train is disabled and a second train fails a surveillance test.*

Based on the reporting criteria in 10 CFR 50.73 and the reporting guidelines in NUREG 1022, Revision 2, the inspectors concluded that the licensee failed to report this event as a loss of safety function as required. This issue was entered into the licensee's CAP as IR 1463675, "NRC Challenge of Reportability Criterion of LER." Corrective actions included an action to report this event in accordance with NRC requirements. The licensee also submitted a License Amendment Request to revise the setpoint for the affected containment radiation monitors.

Analysis: The inspectors determined that the failure to submit a LER required by 10 CFR 50.73 for a loss of safety function after both containment area radiation monitors 1/2AR11J and 1/2AR12J were considered inoperable was a performance deficiency.

The inspectors determined that this issue had the potential to impact the regulatory process based, in part, on the generic communications that 10 CFR 50.73 reports serve, the required inspection reviews that the NRC performs on all LERs, and the potential impact on licensee performance assessment. Since the issue impacted the regulatory process, it was dispositioned through the Traditional Enforcement process. The inspectors determined that this issue was a Severity Level IV violation based upon similar examples in the NRC Enforcement Policy. Specifically, Example 6.d.10 of the NRC Enforcement Policy discussed the failure to submit a complete 10 CFR 50.73 report (LER) as follows:

- Example 6.d.10: “A failure to identify all applicable reporting codes on a LER that may impact the completeness or accuracy of other information (e.g., performance indicator data) submitted to the NRC.”

The inspectors determined the technical issue associated with having a non-conservative setpoint for the containment area radiation monitors in certain conditions was a performance deficiency. However, it was considered a minor violation because the issue was similar to Example 6.c of IMC 0612, Appendix E, “Examples of Minor Issues.” Specifically, this was a non-significant setpoint error since the automatic isolation would only be delayed during certain startup conditions and the licensee had determined that the unassessed dose from the delay actuation was less than 10 percent of the 10 CFR 50, Appendix I, design objectives as specified by the ODCM limits, and the instantaneous effluent release would not exceed the TS instantaneous dose rate limits for gases.

Because cross-cutting aspects do not apply to traditional enforcement issues, no cross-cutting aspect was assigned to this Severity Level IV violation.

Enforcement: 10 CFR 50.73(a), “Reportable Events,” requires, in part, that, “The holder of an operating license under this part or a combined licensee under Part 52 of this chapter (after the Commission had made the finding under 52.103(g) of this chapter) for a nuclear power plant (licensee) shall submit a LER for any event of the type described in this paragraph within 60 days after the discovery of the event,” including in accordance with Title 10 CFR 50.73(a)(2)(v), “Any event or condition that could have prevented the fulfillment of the safety function of structures or systems that are needed to:...(C) Control the release of radioactive material.”

Contrary to the above, between August 4, 2012, and December 31, 2012, the licensee failed to submit a LER within 60 days of discovery that Unit 1 and Unit 2 containment area radiation monitors 1/2AR11J and 1/2AR12J were unable to perform their safety function to control the release of radioactive materials. Corrective actions included the planned issuance of an updated LER and re-evaluating the Safety System Functional Failure PI input. Because this violation was of very low safety significance and because this issue was entered into the licensee’s CAP as IR 1463675, “NRC Challenge of Reportability Criterion of LER,” it is being treated as a Severity Level IV NCV consistent with Section 2.3.2 of the NRC Enforcement Policy. **(NCV 05000456/2012005-03; 05000457/2012005-03, Failure to Submit a 10 CFR 50.73(a)(2)(v) Report for Inoperable Containment Area Radiation Monitors)**

.6 Mitigating Systems Performance Index - Emergency AC Power System

a. Inspection Scope

The inspectors sampled licensee submittals for the Mitigating Systems Performance Index (MSPI) - Emergency AC Power System PI for the period from the third quarter 2011 through the third quarter 2012. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, dated October 2009, were used. The inspectors reviewed the licensee's operator narrative logs, MSPI derivation reports, IRs, event reports, and NRC Integrated Inspection Reports for the period of October 2011 through September 2012, to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, whether the change was in accordance with applicable NEI guidance. The inspectors also reviewed the licensee's IR database to determine if any problems had been identified with the PI data collected or transmitted for this indicator. Documents reviewed are listed in the Attachment.

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

b. Findings

No findings were identified.

.7 Reactor Coolant System Leakage

a. Inspection Scope

The inspectors sampled licensee submittals for the RCS Leakage PI on November 26, 2012 for the period from the third quarter 2011 through the third quarter 2012. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, dated October 2009, were used. The inspectors reviewed the licensee's operator logs, RCS leakage tracking data, IRs, event reports and NRC Integrated Inspection Reports for the period of October 2011 through September 2012, to validate the accuracy of the submittals. The inspectors also reviewed the licensee's IR database to determine if any problems had been identified with the PI data collected or transmitted for this indicator. Documents reviewed are listed in the Attachment.

This inspection constituted two RCS leakage samples as defined in IP 71151-05.

b. Findings

No findings were identified.

.8 Mitigating Systems Performance Index - Residual Heat Removal System

a. Inspection Scope

The inspectors sampled licensee submittals for the MSPI - Residual Heat Removal System PI for the period from the third quarter 2011 through the third quarter 2012. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, dated October 2009, were used. The inspectors reviewed the licensee's operator narrative logs, IRs, MSPI derivation reports, event reports and NRC Integrated Inspection Reports for the period of October 2011 through September 2012, to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, whether the change was in accordance with applicable NEI guidance. The inspectors also reviewed the licensee's IR database to determine if any problems had been identified with the PI data collected or transmitted for this indicator. Documents reviewed are listed in the Attachment.

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

b. Findings

No findings were identified.

.9 Mitigating Systems Performance Index - Cooling Water Systems

a. Inspection Scope

The inspectors sampled licensee submittals for the MSPI - Cooling Water Systems PI for the period from the third quarter 2011 through the third quarter 2012. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, dated October 2009, were used. The inspectors reviewed the licensee's operator narrative logs, IRs, MSPI derivation reports, event reports and NRC Integrated Inspection Reports for the period of October 2011 through September 2012, to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, whether the change was in accordance with applicable NEI guidance. The inspectors also reviewed the licensee's IR database to determine if any problems had been identified with the PI data collected or transmitted for this indicator. Documents reviewed are listed in the Attachment.

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

b. Findings

No findings were identified.

.10 Mitigating Systems Performance Index - High Pressure Injection Systems

a. Inspection Scope

The inspectors sampled licensee submittals for the MSPI - High Pressure Injection Systems PI for both Unit 1 and Unit 2 for the period from the third quarter 2011 through the third quarter 2012. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, dated October 2009, were used. The inspectors reviewed the licensee's operator narrative logs, IRs, MSPI derivation reports, event reports and NRC Integrated Inspection Reports for the period of October 2011 through September 2012, to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, whether the change was in accordance with applicable NEI guidance. The inspectors also reviewed the licensee's IR database to determine if any problems had been identified with the PI data collected or transmitted for this indicator. Documents reviewed are listed in the Attachment.

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

b. Findings

No findings were identified.

.11 Mitigating Systems Performance Index - Heat Removal System

a. Inspection Scope

The inspectors sampled licensee submittals for the MSPI - Heat Removal System PI for the period from the third quarter 2011 through the third quarter 2012. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, dated October 2009, were used. The inspectors reviewed the licensee's operator narrative logs, IRs, event reports, MSPI derivation reports, and NRC Integrated Inspection Reports for the period of October 2011 through September 2012, to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, whether the change was in accordance with applicable NEI guidance. The inspectors also reviewed the licensee's IR database to determine if any problems had been identified with the PI data collected or transmitted for this indicator. Documents reviewed are listed in the Attachment.

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

b. Findings

No findings were identified.

## 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 that they were being entered into the licensee's CAP at an appropriate threshold, that adequate attention was being given to timely corrective actions, and that adverse trends were identified and addressed. Attributes reviewed included the complete and accurate identification of the problem; that timeliness was commensurate with 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 listed 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 Selected Issue Follow-Up Inspection

#### a. Inspection Scope

During the routine review of items entered in the licensee's CAP, the inspectors selected a corrective action item documenting a potential issue with the separation of internal valve components (i.e., stem-disc separation) due to its potential to impact equipment operability for an in-depth review.

Additionally, the inspectors selected a corrective action item documenting operating experience from another licensee facility regarding spent fuel pool boron coupon testing for an in-depth review and focused on the evaluation that permitted deviation from pre-established acceptance criteria.

The inspectors reviewed the licensee's corrective actions for the selected issues and determined whether: (1) the problems were accurately identified; (2) the causes were adequately ascertained; (3) extent of condition and generic implications were appropriately addressed; (4) previous occurrences were considered; and (5) corrective actions proposed and/or implemented were appropriately focused to address the problems and were commensurate with the safety significance of the issues. Documents reviewed are listed in the Attachment.



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

b. Findings

No findings were identified.

.3 Daily Corrective Action Program Reviews

a. Inspection Scope

To facilitate the identification of repetitive equipment failures and 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.

.4 Semi-Annual Trend Review

a. Inspection Scope

The inspectors performed a review of the licensee's CAP and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors' review was focused on repetitive equipment issues, but also considered the results of daily inspector CAP item screening discussed in Section 40A2.2 above, licensee trending efforts, and licensee human performance results. The inspectors' review nominally considered the 6 month period of April 1, 2012, through September 30, 2012, although some examples expanded beyond those dates where an increase in the scope of the trend was warranted.

The review also included issues documented outside the scope of the CAP, such as major equipment problem lists, repetitive and/or rework maintenance lists, departmental problem and/or challenge lists, system health reports, quality assurance audit and surveillance reports, self-assessment reports, and Maintenance Rule assessments. The inspectors compared and contrasted their results with the results contained in the licensee's CAP trending reports. Corrective actions associated with a sample of the issues identified in the licensee's trending reports were reviewed for adequacy.

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

b. Findings

No findings were identified.

.5 Review of Operator Workarounds

a. Inspection Scope

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

The inspectors performed a review of the cumulative effects of OWAs. The documents listed in the Attachment were reviewed to accomplish the objectives of the inspection procedure. The inspectors reviewed both current and historical operational challenge records to determine whether the licensee was identifying operator challenges at an appropriate threshold, had entered them into their CAP, and proposed or implemented appropriate and timely corrective actions which addressed each issue. Reviews were conducted to determine if any operator challenge could increase the possibility of an Initiating Event, was contrary to training, required a change from long-standing operational practices, or created the potential for inappropriate compensatory actions. Additionally, all temporary modifications were reviewed to identify any potential effect on the functionality of Mitigating Systems, impeded access to equipment, or required equipment uses for which the equipment was not designed. Daily plant and equipment status logs, degraded instrument logs, and operator aids or tools being used to compensate for material deficiencies were also assessed to identify any potential sources of unidentified OWAs.

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

b. Findings

No findings were identified.

40A3 Follow-Up of Events and Notices of Enforcement Discretion (71153)

(Closed) Licensee Event Report 2012-003-00, Containment Area Radiation Monitors Inoperable for Longer Than Allowed by Technical Specifications Due to Inadequate Procedure Controls

On August 3, 2012, the licensee submitted LER 2012-003-00, "Containment Area Radiation Monitors Inoperable for Longer Than Allowed by Technical Specifications Due to Inadequate Procedure Controls," in accordance with 10 CFR 50.73(a)(2)(i)(B) as an operation or condition prohibited by the plant's TSs. However, the licensee did not report this event as a condition that as a result of a single cause could have prevented the fulfillment of a safety function needed to isolate containment. It was also determined that this condition existed since initial startup.

The inspectors reviewed LER 2012-003-00 and reporting guidance contained in NUREG-1022, Revision 2, and discussed the issue with the NRC NRR subject matter expert. The inspectors determined that this event represented a condition that as a result of a single cause could have prevented the fulfillment of a safety function needed

to isolate containment. Specifically, both containment area radiation monitors were inoperable with non-conservative setpoints to isolate containment ventilation.

Additional discussion of this issue, including a Severity Level IV traditional enforcement violation, is discussed in detail in Section 4OA1.5(b), "Failure to Submit a 10 CFR 50.73(a)(2)(v) Report for Inoperable Containment Radiation Monitors," of this report.

This LER is closed.

#### 4OA5 Other Activities

.1 (Closed) NRC Temporary Instruction 2515/177, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems (NRC Generic Letter 2008-01)"

a. Inspection Scope

During an earlier inspection period, the inspectors verified the licensee implemented or was in the process of implementing the commitments, modifications, and programmatically controlled actions described in the licensee's response to NRC GL 2008-01, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems." This earlier activity was conducted in accordance with Temporary Instruction (TI) 2515/177 and was documented in NRC Inspection Report 05000454/2011002; 05000455/2011002. The TI remained opened for the Byron Station because, at the conclusion of that inspection period, questions remained unresolved regarding the use of the software GOTHIC to justify the acceptability of a design bases change which assumed the presence of gas voids in the suction piping from the containment emergency sump.

During this inspection period, the inspectors consulted with NRR and determined that the application of GOTHIC for gas voiding required further evaluation by NRR. Therefore, this issue is being identified as an Unresolved Item (URI) as described in Section 4OA5.1.b(1). Based on the inspection results documented in NRC Inspection Report 05000454/2011002; 05000455/2011002 and the identification of the resolution for the acceptability of GOTHIC for predicting void transport behavior as a URI, this TI is considered closed for the Byron Station.

Documents reviewed are listed in the Attachment.

b. Findings

(1) Concerns with the Bases for the Acceptability of GOTHIC for Void Transport Prediction

Introduction: The inspectors identified an URI regarding the use of the software GOTHIC to justify the acceptability of a design bases change which incorporated gas voids in the suction piping from the containment emergency sump into the design of the plant.

Description: The licensee identified unventable sections at the suction piping from the containment emergency sump downstream of the Unit 1 and Unit 2 SI8811 and CS009A valves. As a result, the licensee evaluated the impact of a maximum potential void into

on licensing and design bases. The licensee justified the maximum void size through the use of the software GOTHIC. However, the inspectors noted instances where the basis of GOTHIC as a void assessment analysis tool was questionable. Specifically, the licensee used WCAP-16631-NP, "Testing and Evaluation of Gas Transport to the Suction of ECCS [Emergency Core Cooling System] Pumps," to demonstrate that GOTHIC could acceptably predict quantitative void transport behavior. WCAP-16631-NP documented tests that were conducted by Westinghouse to study the transport of a gas void through a piping system. As discussed in NRC Inspection Report 05000454/2011002; 05000454/2011002, the inspectors noted several differences between test and actual plant configurations and conditions that could impact the overall gas void assessment results as follows:

- The difference between test and plant pressures was not considered in assessing void decrease in the vertical test section. The pressure range used during the test was significantly lower than the typical range in nuclear power plants. This effect would be insignificant in a nuclear power plant due to the higher pressures. Therefore, the inspectors questioned if the void fraction change observed during testing would be analogous in a nuclear power plant.
- Two phase fluid flow test data typically exhibited significant scatter. This was addressed by running many duplicate tests and carefully examining the test results. However, NRR stated in ML090150637, "Forthcoming Meeting With The Nuclear Energy Institute To Discuss NRC Generic Letter 2008-01," that this effort was not fully successful and some of the conclusions were not adequately supported by the test data due to data scatter. For example, this effort did not address allowance for uncertainty and the effect of actual plant pressures in contrast to test pressures.
- The inspectors questioned if the test report adequately considered a "water fall" effect (also known as "hydraulic jump") when the upper part of the vertical pipe was voided. Specifically, the inspectors questioned if the pipe length used for the test was representative of the limiting conditions of a plant. The inspectors were concerned that such an effect could propel air further down in the pipe than would be predicted using a single dimensional Froude number and would be of concern if the vertical pipe length was significantly less than the pipe used for the test.
- The use of an average of pipe slopes to determine an equivalent pipe length associated with an elbow with a void reduction of 20 percent was debatable. For example, the average slope of -0.055 was obtained from slopes of -0.333, -0.15, and -0.0883. In addition, as discussed above, the 20 percent factor did not consider the pressures that would be typically present in nuclear power plants.

Although the basis for this void assessment tool was questionable, the inspectors noted that the licensee used significant conservatisms when assessing the void sizes at these locations. Consequently, it was determined, with assistance from NRR, that there was reasonable assurance that these unventable locations did not represent an adverse condition pending further assessment of GOTHIC. This issue is an URI pending further NRR review of the use of GOTHIC to justify the acceptability of the design bases change, which incorporated the potential unventable voids in the suction piping from the containment emergency sump into the UFSAR and determination of further NRC actions

to resolve the issue. **(URI 05000454/2012005-04; 05000455/2012005-04, Concerns with the Bases for the Acceptability of GOTHIC for Void Transport Prediction)**

.2 (Discussed) NRC Temporary Instruction 2515/187 – “Inspection of Near-Term Task Force Recommendation 2.3 Flooding Walkdowns”

a. Inspection Scope

The inspectors determined whether licensee walkdown packages Unit 1 13-Line Wall, Unit 1 1A and 1D Main Steam Isolation Valve Room Probable Maximum Precipitation (PMP) Curb, and River Screen House Penetration RH-15C contained the elements as specified in the NEI 12-07 Walkdown Guidance document:

The inspectors accompanied the licensee on their walkdown of River Screen House Penetration RH-15C; and Unit 1 A and D Main Steam Isolation Valve Room PMP Curb and verified that the licensee confirmed the following flood protection features:

- Visual inspection of the flood protection feature was performed if the flood protection feature was relevant. External visual inspection for indications of degradation that would prevent its credited function from being performed was performed;
- Critical SSC dimensions were measured;
- Available physical margin, where applicable, was determined; and
- Flood protection feature functionality was determined using either visual observation or by review of other documents.

At the end of the inspection period, the inspectors planned to perform additional independent walkdowns during the first quarter of 2013.

The inspectors verified that noncompliances with current licensing requirements; and issues identified in accordance with the 10 CFR 50.54(f) letter, Item 2.g of Enclosure 4, were entered into the licensee's CAP. In addition, issues identified in response to Item 2.g that could challenge risk-significant equipment and the licensee's ability to mitigate the consequences will be subject to additional NRC evaluation.

b. Findings

No findings were identified.

.3 (Discussed) NRC Temporary Instruction 2515/188 – “Inspection of Near-Term Task Force Recommendation 2.3 Seismic Walkdowns”

a. Inspection Scope

The inspectors accompanied the licensee on their seismic walkdowns of the Unit 1 and Unit 2 Auxiliary Electric Equipment Room; Auxiliary Building; and the Fuel Handling Building, and verified that the licensee confirmed that the following seismic features associated with 1PA01J, Unit 1 Process I&C Rack, Protection Channel 1; 2PA01J, Unit 2 Process I&C Rack, Protection Channel 2; 2MS018D, 2D Steam Generator Power Operated Relief Valve; and 1FC8762A, Spent Fuel Pit Heat Exchanger Inlet Valve were free of potential adverse seismic conditions:

- Anchorage was free of bent, broken, missing or loose hardware;
- Anchorage was free of corrosion that was more than mild surface oxidation;
- Anchorage was free of visible cracks in the concrete near the anchors;
- Anchorage configuration was consistent with plant documentation;
- SSCs would not be damaged from impact by nearby equipment or structures;
- Overhead equipment, distribution systems, ceiling tiles and lighting, and masonry block walls were secure and not likely to collapse onto the equipment; and
- Attached lines had adequate flexibility to avoid damage.

Although the following were not documented explicitly in the licensee's evaluations, the licensee had indicated that their evaluations included an assessment for:

- The area appeared to be free of potentially adverse seismic interactions that could cause flooding or spray in the area;
- The area appeared to be free of potentially adverse seismic interactions that could cause a fire in the area; and
- The area appeared to be free of potentially adverse seismic interactions associated with housekeeping practices, storage of portable equipment, and temporary installations (e.g., scaffolding, lead shielding).

At the end of the inspection period, the inspectors planned to conduct additional independent walkdowns during the first quarter of 2013.

Observations made during walkdowns that could not be determined to be acceptable were entered into the licensee's CAP for evaluation.

Additionally, the inspectors verified that items that could allow the spent fuel pool to drain down rapidly were added to the Seismic Walkdown Equipment List (SWEL). Neither the licensee nor the resident inspection staff identified any equipment that could rapidly drain the spent fuel pool. Therefore, no additional items were added to the SWEL and walked down by the licensee.

b. Findings

No findings were identified.

4OA6 Management Meetings

.1 Exit Meeting Summary

On January 7, 2013, the inspectors presented the inspection results to Mr. T. Tulon, Byron Site Vice President, and other members of the licensee staff.

The licensee acknowledged the issues presented. The inspectors confirmed that none of the potential report input discussed was considered proprietary.

.2 Interim Exit Meetings

- On November 2, 2012, the inspectors presented the inspection results for the area of LORT to Mr. T. Tulon, and other members of the licensee's staff.
- On November 2, 2012, the inspectors presented the inspection results for the areas of radioactive solid waste processing and radioactive material handling, storage, and transportation; and RCS specific activity performance indicator verification to Mr. T. Tulon and other members of the licensee's staff.
- On November 19, 2012, an interim telephone exit meeting was held with Mr. M. McCue, Byron Operations Training Manager, to discuss the overall pass/fail results of the Biennial Written Examination and the Annual Operating Test.
- On December 10, 2012, an interim telephone exit meeting was held with Ms. A. Corrigan to discuss the results of the TI 2515-177 inspection.
- On January 14, 2013, an interim telephone exit meeting was held with Mr. D. Gudger to discuss the results of an inspection in the Performance Indicators Verification area.

The licensee acknowledged the issues presented. The inspectors confirmed that none of the potential report input discussed was considered proprietary.

ATTACHMENT: SUPPLEMENTAL INFORMATION

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### Licensee

T. Tulon, Site Vice President  
B. Youman, Plant Manager  
S. Gackstetter, Training Manager  
G. Contrady, Programs Manager  
A. Corrigan, Design Manager  
D. Gudger, Regulatory Assurance Manager  
B. Spahr, Maintenance Director  
D. Drawbaugh, Emergency Preparedness Manager  
S. Kerr, Work Management Manager  
J. Reed, Radiological Technical Support Manager  
T. Eliakis, ISFSI Project Manager  
S. Briggs, Operations Manager  
M. McCue, Operations Training Manager

#### Nuclear Regulatory Commission

E. Duncan, Chief, Branch 3, Division of Reactor Projects  
A.M. Stone, Chief, Engineering Branch 2



## LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

### Opened

05000454/2012005-01	NCV	Failure to Prevent Excessive Silt Buildup in the 1B Safety Injection Pump Oil Cooler (Section 1R15.1.b.1)
05000454/2012005-02	NCV	Inadequate Work Instructions Lead to Failure of the 1B SX Pump Motor (Section 1R15.b.2)
05000454/2012005-03; 05000455/2012005-03	NCV	Failure to Submit a 10 CFR 50.73(a)(2)(v) Report for Inoperable Containment Area Radiation Monitors (Section 4OA1.5.b)
05000454/2012005-04; 05000455.2012005-04	URI	Concerns with the Bases for the Acceptability of GOTHIC for Void Transport Prediction (Section 4OA5.1.b.1)

### Closed

05000454/2012005-01	NCV	Failure to Prevent Excessive Silt Buildup in the 1B Safety Injection Pump Oil Cooler (Section 1R15.1.b.1)
05000454/2012005-02	NCV	Inadequate Work Instructions Lead to Failure of the 1B SX Pump Motor (Section 1R15.b.2)
05000454/2012005-03; 05000455/2012005-03	NCV	Failure to Submit a 10 CFR 50.73(a)(2)(v) Report for Inoperable Containment Area Radiation Monitors (Section 4OA1.5.b)
05000454/2012-003-00; 05000455/2012-003-00	LER	Licensee Event Report 2012-003-00, Containment Area Radiation Monitors Inoperable for Longer than Allowed by Technical Specifications Due to Inadequate Procedure Controls (Section 4OA3)

## LIST OF DOCUMENTS REVIEWED

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

### **Section 1R01: Winter Seasonal Readiness Preparations (71111.01)**

- Byron Winter Readiness 2012 Work Down Data, November 27, 2012
- WC-AA-107; Seasonal Readiness, Revision 10
- 0BOSR XFT-A1; Freezing Temperature Equipment Protection SH and Department Support Requirements, Revision 14
- 0BOSR XFT-A2; Freezing Temperature Equipment Protection Auxiliary Steam Boilers, Revision 2
- 0BOSR XFT-A3; Freezing Temperature Equipment Protection Plant Ventilation Systems, Revision 8
- 0BOSR XFT-A4; Freezing Temperature Equipment Protection Protected Area Buildings Ventilation Systems and Tanks, Revision 7
- 0BOSR XFT-A5; Non-Protected Area Buildings, Revision 7
- IR 1348223; 2011 – 2012 Winter Readiness Critique, March 30, 2012
- IR 1390961; Alarm – Cable Spreading Room Vent Filter D/P High, July 20, 2012
- IR 1397620; OOS Equipment that Affects Winter Readiness, August 6, 2012
- IR 1426384; Temperature Controller for SX SWGR Sticking, October 15, 2012
- IR 1437095; Several Winter Readiness WO Scheduled After 12/01, November 7, 2012
- IR 1443440; Winter Readiness Review Identified Discrepancies, October 30, 2012
- IR 1443499; LV-85 Insulation is Loose, November 23, 2012
- OP-AA-108-107; Switch Yard Control, Revision 3
- OP-AA-108-107-1001; Station Response to Grid Capacity Conditions, Revision 4
- OP-AA-108-1002; Interface Procedure between COMED /PECO and EXELON GENERATION for Transmission Operations, Revision 6

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

IR 1444781; Unit 2 CST Heater Temperature Lower Than Expected, November 27, 2012

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

- BOP AF-M1; Auxiliary Feedwater System Valve Lineup, Revision 17
- Drawing M-37; Diagram of Auxiliary Feedwater

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

- IR 1436100; NRC Walkdown Identifies Dried Boric Acid Deposits, November 5, 2012

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

- IR 1452097; Evaluation of Fire Rated Assemblies Needed, December 13, 2012
- Pre-Fire Plan; Fire Zone 5.2-1, Division 11 ESF Switchgear Room, Revision 000
- Pre-Fire Plan; Fire Zone 5.5-2, Unit 2 Auxiliary Electrical Equipment Room, Revision 001

- Pre-Fire Plan; Fire Zone 11.2-0 N, Auxiliary Building General Area Elevation 346'-0", Revision 000
- Pre-Fire Plan; Fire Zone 11.2-0 NW, Auxiliary Building General Area Elevation 346'-0", Revision 000
- Pre-Fire Plan; Fire Zone 11.2-0 S, Auxiliary Building General Area Elevation 346'-0", Revision 000
- Pre-Fire Plan; Fire Zone 11.2-0 SW, Auxiliary Building General Area Elevation 346'-0", Revision 000
- Pre-Fire Plan; Fire Zone 11.2-0 W, Auxiliary Building General Area Elevation 346'-0", Revision 000
- Pre-Fire Plan; Fire Zone 11.3F-1, Safety Injection Pump 1B Room, Revision 000
- Pre-Fire Plan; Fire Zone 11.6C-0, Auxiliary Building Laundry Room Elevation 426-0, Revision 000
- Byron Fire Protection Report, Amendment 23, December 2008, Sections 2.3-51, 2.3-59, 2.3-93, 2.3-112, 2.3-142
- Fire Protection Report; Figure 2.3-10, Sheet 1
- Fire Protection Report; Figure 2.3-8, Sheet 3
- Fire Protection Report; Figure 2.3-15
- Fire Protection Report; Figure 2.3-14

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

- IR 1432043; C02 Extinguisher U2 MEER Have Expired OEM Tags, October 26, 2012
- IR 1435040; Missing Fireproofing on Non-TRM Column, November 02, 2012

#### **Section 1R11: Licensed Operator Regualification Program (71111.11)**

- OP-AA-150-102; NRC Active License Maintenance; Revision 9
- TQ-AA-150, Operator Training Programs, Revision 7
- TQ-AA-155; Conduct of Simulator Training and Evaluations; Revision 0
- TQ-AA-155-06; Simulator Evaluation - Shift Manager - Competency Standards
- TQ-AA-155-07; Simulator Evaluation - STA or IA - Competency Standards
- TQ-AA-155-08; Simulator Evaluation - Individual - Competency Standards
- TQ-AA-155-09; Simulator Evaluation - Crew - Competency Standards
- TQ-AA-306; Simulator Management; Revision 4
- TQ-AA-306; Byron Simulator Core Model Evaluation for U-1 Cycle 19, Attachment 10, MTC of Reactivity
- TQ-AA-306; Byron Simulator Core Model Evaluation for U-1 Cycle 19, Attachment 11, Rod Worth Coefficient of Reactivity
- TQ-AA-306; Byron Simulator Core Model Evaluation for U-1 Cycle 19, Attachment 12, Boron Coefficient of Reactivity
- TQ-AA-306; Byron Simulator Core Model Evaluation for U-1 Cycle 19, Attachment 13; Xenon Worth
- TQ-AA-306; Byron Simulator Core Model Evaluation for U-1 Cycle 19, Attachment 16, Approach to Criticality Using Boric Acid
- TQ-AA-306; Byron Simulator Core Model Evaluation for U-1 Cycle 19, Attachment 17, Approach to Criticality Using Control Rods
- Byron Simulator Steady State Test; Lower Power Level
- Byron Simulator Steady State Test; Mid Range Power Level
- Byron Simulator Steady State Test; Full Power Level

#### Corrective Action Program Documents:

- IR1200089, 1D RCP Seal Injection Flow Restrictions, April 6, 2011
- IR1205784, P14 Actuation During Performance of BGP-100-1, April 6, 2011
- IR1205960, Closure of Steam Dumps and FW Isolation During 1B SSPS Testing, April 21, 2011
- IR1206600, Additional Boron Adjustments Required During S/U Preps, April 23, 2011
- IR1206893, Main Generator Trip During Voltage Adjustments for Sync to Grid, April 24, 2011
- IR1207536, Performance Decline During 1BR17 and Causal Analysis of Continued Cyclic Performance, April 25, 2011
- IR1252529, 2A DG Vent Fan Trip Signal Not Reset, August 17, 2011
- IR1323547, U2 Manual Reactor Trip Due to 2C S/G High Level, February 6, 2012
- IR1362020, Wrong Missile Barrier Tagged During Clearance Order, May 3, 2012
- IR 1405537; Acceptance Criteria for Simulator Core Testing Not Met
- IR1405629; Operator Action Time Validation Results, August 27, 2012
- IR 1368972; Unit 1 Steam Flow Computer Points Appear to be Inaccurate

#### Miscellaneous Documents:

- List of Open Simulator Work Requests
- List of Closed Simulator Work Requests
- Training and Staffing Audit Report, June 21, 2012
- 2012 Pre-71111.11 Inspection, June 13, 2012
- 2012 Week 2 LORT Comprehensive Written Exam
- 2012 Week 4 LORT Comprehensive Written Exam
- Numerous JPMs from Week 2 and Week 4 of the Requalification Exam
- Week 4, Scenario BY-58, Revision 4
- Week 4, Scenario BY-73, Revision 4

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

- IR 1428886; Unit 1 SX Exceeded Maintenance Rule Unavailable Limit in September, September 10, 2012
- IR 1428902; Unit 1 SX to Exceed Maintenance Rule Unavailable Limit in October, September 10, 2012

#### **Section 1R13: Maintenance Risk Assessments and Emergent Work Control (71111.13)**

- OP-AA-108-117, Protected Equipment Program, Revision 2
- Protected Equipment List – Week of November 26, 2012
- IR 1453346; 2A CS Not Included in Online Risk During 2A RH Window, December 16, 2012
- Risk Evaluations for Week of October 22, 2012, Revision 1 – Revision 4

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

- EC 390906; Past Operability Evaluation for the 1B SI Pump, November 20, 2012
- ER-AA-340; GL 89-13 Program Implementing Procedure, Revision 6
- Apparent Cause Report; The 1B SI Pump Thrust and Outboard Bearing High Temperature on September 28, 2012
- IR 1414688; Apparent Cause Report – Equipment; 1B Essential Service Water Pump Tripped Unexpectedly, September 18, 2012

- WO 857654-07; AT 1SX01PB-M De-Term Cables
- WO 857654-07; De-Term 1B SX Pump for Replacement, September 9, 2009
- WO 1216874 01; 89-13 Heat Exchanger Inspection 1B SI PP Brng Oil Cleaner, August 25, 2010
- IR 1419800; Secured 1B SI PP During 1BOSR 8.1.11-2 Test Due to Hi Temp, September 28, 2012
- IR 1420412; Is Generic Letter 89-13 Program Basis Document Being Met?, September 30, 2012
- IR 1428181; 2D SG PORV UPS Operability Assessment Review, June 29, 2012
- Unit 1 Standing Order; Log Number: 12-046, Unit 1 Main Generator Hydrogen Leak, Revision 2
- Regulatory Guide 1.32; Criteria for Safety Related Electric Power Systems for Nuclear Power Plants, Revision 2
- Regulatory Guide 1.53; Application of the Single-Failure Criterion to Nuclear Power Plant Protection Systems, June 1973
- Regulatory Guide 1.73; Qualification Tests of Electric Valve Operators Installed Inside the Containment of Nuclear Power Plants, January 1974
- Regulatory Guide 1.75; Physical Independence of Electrical Systems, Revision 2
- Regulatory Guide 1.81; Shared Emergency and Shutdown Electric Systems for Multi-Unit Nuclear Power Plants, Revision 1
- Regulatory Guide 1.93; Availability of Electrical Power Sources, December 1974
- Regulatory Guide 1.118; Periodic Testing of Electrical Power and Protection Systems, Revision 3
- Safety Guide 6; Independence Between Redundant Standby (Onsite) Power Sources and Between their Distribution Sources, March 1971
- IR 1319908; RCR Unit 2 Reactor Trip Loss of Offsite Power, Revision 8
- 6E-1-4030AP30; Schematic Diagram 4160V ESF Switchgear Bus 141 Undervoltage, Revision T
- PSB-1; Branch Technical Position, Adequacy of Station Electric Distribution System Voltages, July 1981
- IEEE Std. 242; Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems, 1986
- IEEE Std. 308; Class 1E Power Systems for Nuclear Power Generating Stations, 1980
- EC 387615; Evaluation of Effects from Switchyard Single Open-Phase Condition on 480V ESF Switchgear and MCC Loads, Revision 0
- LTR-TA-12-20; Summary of Evaluated Delay Time Increases for AFW and ECCS Actuation at Byron/Braidwood Units 1 and 2, February 5, 2012

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

- IR 1431727; RCFC Discharge Check Damper Questions, October 26, 2012
- IR 1453692; WR Needed to Lower the 1B SI Motor Oil Level (Non-Emergent), December 18, 2012

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

- NF-AP-542; Beacon Startup Thermocouple Calibration, Revision 7
- CC-AA-112; Temporary Configuration Changes, Revision 18
- IR 1419390; B1R18 – Failed Core Exit Thermocouple on Unit 1, September 28, 2012
- IR 1241217; Thermocouple 51 Failed High on Unit 1, July 18, 2011
- IR 1247106; Incore Thermocouple Issue, August 2, 2011

- IR 1248524; PDMS Surveillance Exceeded Deviation Allowed Based on Low TC, August 6, 2011
- IR 1274105; Core Exit Thermocouple Not Indicating Accurate, October 8, 2011
- IR 1274109; Core Exit Thermocouple Not Indicating Accurate, October 8, 2011
- IR 1274111; Core Exit Thermocouple Not Indicating Accurate, October 8, 2011
- IR 1295574; Low Margin for Unit 1 Core Exit Thermocouples Input to PDMS, November 29, 2011
- IR 1310705; Unit 2 Train B Core Exit Thermocouples Fail As-Is, January 5, 2012
- IR 1359794; Unit 2 Train B Core Exit Thermocouple 65 is Indicating Higher than Expected, April 27, 2012
- IR 1420351; Relanding of Leads for Failed Core Exit Thermocouples, September 30, 2012

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

- IR 1431727; RCFC Discharge Check Damper Questions, October 26, 2012

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

- 1BOSR 0.5-2.SI.1-2; 1SI8821B, 1SI8812B, 1SI8804B and 1SI8920 Stroke Test, Revision 7
- IR 1442312; Diesel Driven Fire Pump Secured Due to Sparking, November 19, 2012
- IR 1447410; Diesel Fire Pump Solenoid Manual Lever, December 3, 2012
- IR 1458764; Need WR for 0B Fire Pump, January 4, 2013
- BOP FP-5; Manual Startup and Shutdown of the Diesel Driven Fire Pump, Rev. 15
- BAP 1600-11; Work Order Post Maintenance Testing Guide, Revision 15
- 0BOSR 10.b.12-1; Fire Protection Pump Flow and Pressure Test, Revision 4
- WO1585214; Diesel Fire Pump Surveillance, November 29, 2012

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

- 1BOSR 0.5-3.SX.1-2; Unit One Test of the 1B Essential Service Water Miscellaneous System Valve, Revision 5
- 1BOSR 3.2.8-610B; Unit One ESFAS Instrumentation Slave Relay Surveillance and Automatic Actuation Test (Train B Automatic Safety Injection – K610), Revision 3
- 2BOSR 3.2.8-632B; Unit 2 ESFAS Instrumentation Slave Relay Surveillance (Train B Auxiliary Feedwater Actuation – Relays K632, K639), Revision 1
- 2BOSR 4.13.1-1; Unit 2 Reactor Coolant System Water Inventory Balance Surveillance Computer Calculation, Revision 28
- IR 1443843; Investigation into RISE in Unit 1 RCS Leak Rate, November 24, 2012
- IR 1443844; Elevated Unit 1 RCS Leakrate, November 24, 2012
- IR 1443861; 1CV8514 Packing Leakoff Line Temperature Elevated, November 24, 2012
- 2BOSR 5.5.8.CV.5-1a; Unit 2 Group A Inservice Testing Requirements for 2A Charging Pump 2CV01PA, Revision 3
- IR 1173040; 2A CV PP Potentially Made Inoperable Unnecessarily, February 8, 2011
- IR 1387589; Follow-up BACC Walkdown on 2A CV Pump, July 11, 2012
- IR 1400702; 2A CV Pump Failed to Develop 10 PSIG Gear Oil Pressure, August 14, 2012
- IR 1401107; 1BOSR 5.5.8.CV.5-2A Revision 5 has Incorrect Acceptance Criteria, August 15, 2012
- IR 1439397; 2A CV PP – Clean Boron Deposits at Seal Area and Casing Flange, November 13, 2012
- IR 1439573; 1BOSR 3.1.5-1 Train A SSPS Bi-Monthly Surveillance Needs Revision, November 13, 2012

- 1BOSR 3.1.5-1; Unit 1 Train A Solid State Protection System Surveillance, November 13, 2012

**Section 2RS8: Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation (71124.08)**

- Docket No. 71-9168; USA/9168/B(U): Model No. CNS8 -120B; Certificate of Compliance for Radioactive Material Packages
- RP-BY-600-1002; Radioactive Waste Shipments to Waste Control Specialists (WCS) Disposal Facility; Revision 1
- RP-AA-600-1004; Radioactive Waste Shipments to Energy Solutions' Clive Utah Disposal Site Containerized Waste Facility; Revision 11
- RP-AA-600-1005; Radioactive Material and Non Disposal Site Waste Shipments; Revision 15
- RP-AA-600-1011; Use and Operation of WMG Software for Gross Gamma Characterization and Generation of Shipping Paperwork; Revision 2
- IR-1289429; Apparent Cause Evaluation; Failure to Include all Hazardous Material on Shipment Manifest; July 7, 2012
- CN-600616890; Texas Commission on Environmental Quality; Radioactive Material License for Waste Control Specialist (WCS); Expiration Date September 10, 2024
- RWS-12-014; Class B Shipment, Radioactive Material, Type B(U) Package, 7, UN2916, De-watered Resin Shipment to Waste Control Specialist, Texas; July 24, 2012
- RWS-12-015; Class B Shipment, Radioactive Material, Type B(U) Package, 7, UN2916, De-watered Resin Shipment to Waste Control Specialist, Texas; July 31, 2012
- RWS-12-016; Class B Shipment, Radioactive Material, Type B(U) Package, 7, UN2916, De-watered Resin Shipment to Waste Control Specialist, Texas; August 7, 2012
- L45677-3; Part-61 Waste Stream Report; Resin; October 25, 2010
- L49915-2; Part-61 Waste Stream Report; Resin; March 29, 2012
- L50017-1; Part-61 Waste Stream Report; Resin; April 20, 2012
- RMS-12-091; Radioactive Material Shipment; LSA-II, 7, UN3321; CRDM Equipment to Westinghouse; September 27, 2012
- RMS-12-061; Radioactive Material Shipment; LSA-II, 7, UN3321; Sealand Containing ISFSI Equipment to Braidwood Facility; August 8, 2012
- RMS-12-026; Radioactive Material Shipment; Excepted Quantity Radioactive Material Shipment; Excepted Package, 7, UN 2911; RD-10B Detectors to Braidwood Facility; March 27, 2012
- RMS-12-039; Radioactive Material Shipment; Excepted Quantity Radioactive Material Shipment of Limited Quantity; UN 2910; 123 Charcoal Trays in a 40 Foot Sealand; May 4, 2012
- RMS-12-066; Radioactive Material Shipment; Excepted Quantity Radioactive Material Shipment of Limited Quantity; UN 2910; Chemical Sample to Teledyne and Brown; August 14, 2012

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

- EP-AA-112; Emergency Response Organization (ERO) Emergency Response Facility (ERF) Activation and Operation, Revision 8
- EP-AA-112-200; TSC Activation and Operation, Revision 8
- EP-AA-112-400; Emergency Operations Facility Activation and Operation, Revision 11
- EP-AA-1000; Standardized Radiological Emergency Plan, Revision 21

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

- IR 1228409, Threshold for SSF Approaching White Region, June 14, 2011
- IR 1364121; Unit 1 RH MSPI Classified as "Exelon Action" for April 2012, May 8, 2012
- Byron Unit 1 Mitigation System Performance Index, Residual Heat Removal System
- IR 1434317; PI in Variance 0.10, Safety System Actuations, October 31, 2012
- IR 1434295; PI in Variance 0.4 Unplanned Automatic and Manual Scrams, November 01, 2012
- IR 1463675; NRC Challenge of Reportability Criterion of LER, January 17, 2013
- IR 1439609; MSPI Failure Reporting for 1B SX and 1B RH Pumps for 3Q12, November 13, 2012
- IR 1439616; MSPI for Unit 1 RHR is at Risk, November 13, 2012
- LS-AA-2080; Monthly Data Elements for NRC Safety System Functional Failures, Revision 4
- LS-AA-2080; Attachment 1, Monthly Data Elements for NRC Safety System Functional Failures, October 2011 to September 2012
- LS-AA-2090; Monthly Data Elements for NRC Reactor Coolant Specific Activity (Dose Equivalent Iodine), Revision 4
- LS-AA-2100; Monthly Data Elements for NRC Reactor Coolant System Leakage, Revision 5
- LS-AA-2100; Byron Unit 1 Mitigating Systems Performance Index, Emergency AC Power System, Quarter 1, 2011 through Quarter 3, 2012
- LS-AA-2100; Attachment 1 for Monthly Data Elements for NRC Reactor Coolant System (RCS) Leakage, Revision 5, December 2011
- LS-AA-2100; Attachment 1 for Monthly Data Elements for NRC Reactor Coolant System (RCS) Leakage, Revision 5, March 2012
- LS-AA-2100; Attachment 1 for Monthly Data Elements for NRC Reactor Coolant System (RCS) Leakage, Revision 5, September 2012
- LS-AA-2100; Byron Unit 1 and Unit 2 Reactor Coolant System Leakage, Quarter 3 for 2011 through Quarter 3 for 2012
- LS-AA-2200, Mitigating System Performance Index Data Acquisition & Reporting, Revision 5
- LS-AA-2200 Attachment 3, Auxiliary Feedwater/Emergency Feedwater Function Data Record, March 2012
- LS-AA-2200 Attachment 3, Auxiliary Feedwater/Emergency Feedwater Function Data Record, September 2012
- LS-AA-2200; Residual Heat Removal Function for January 2012, Revision 4
- LS-AA-2200; Residual Heat Removal Function for March 2012, Revision 4
- LS-AA-2200; Emergency AC Power Function for July 2012, Revision 4
- LS-AA-2200; Emergency AC Power Function for August 2012, Revision 5
- LS-AA-2200; Emergency AC Power Function for September 2012, Revision 5
- LS-AA-2200; Emergency AC Power Function for October 2011, Revision 4
- LS-AA-2200; Emergency AC Power Function for November 2011, Revision 4
- LS-AA-2200; Emergency AC Power Function for December 2011, Revision 4
- MSPI Derivation Report; Unit 2 for December 2011
- MSPI Derivation Report; Unit 1 Unreliability Index (URI), March 2012
- MSPI Derivation Report; Unit 1 Unavailability Index (UAI) for March 2012, November 29, 2012
- LS-AA-2200; Residual Heat Removal Function for January 2012, Revision 4
- LS-AA-2200; Residual Heat Removal Function for July 2012, Revision 4
- LS-AA-2200; Residual Heat Removal Function for September 2012, Revision 4
- MSPI Derivation Report; Unit 1 for September 2012
- MSPI Derivation Report; Unit 2 Unavailability Index for September 2012, November 29, 2012
- MSPI Derivation Report; Unit 2 Unreliability Index for September 2012, November 29, 2012



- Dose Equivalent Iodine Determination of Unit 2 Reactor Coolant Loop and Samplings, which was Observed on October 31, 2012
- Monthly Data Elements for NRC Reactor Coolant Specific Activity (Dose Equivalent Iodine) from January 2011 through December 2011
- Selected Operators' Logs, October 1, 2011 to September 30, 2012
- Unit 1 MSPI Heat Removal System Derivation Report – Unreliability Index, March 2012
- Unit 1 MSPI Heat Removal System Derivation Report – Unavailability Index, March 2012
- Unit 2 MSPI Heat Removal System Derivation Report – Unreliability Index, September 2012
- Unit 2 MSPI Heat Removal System Derivation Report – Unavailability Index, September 2012

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

- IR 1106155; 1B DOST Room Watertight Door Found Open, August 26, 2010
- IR 1412470; B1R18 FAC Component 1FW085B Exam Failure, September 12, 2012
- IR 1419867; R2 Loss of BUS 142 Control Power, September 28, 2012
- IR 1426624; B1R18 CRDM P31/P43 PT's Acceptance Criteria Questioned, October 15, 2012
- IR 1428156; Is a TCCP Required?, October 18, 2012
- IR 1428791; Byron Shift Staffing Analysis, October 19, 2012
- IR 1437349; Site Needs Plan for MED Voltage Motor Retermination/INSP, November 8, 2012
- IR 1431840; MR (A)(1) Determination Needed For Exceeding Reliability Criteria AP2, September 10, 2012
- IR 1431919; MR (A)(1) Determination Needed for Exceeding CM Criteria AP5, September 30, 2012
- IR 1450091; OPEX Braidwood DG O-Ring Issue, December 10, 2012
- IR 1451455; SX Makeup Pump Diesel Expansion Joint Cracked, December 12, 2012
- Licensed Operator Requalification Simulator Scenario Guide; Designated Operator, Revision 0
- WO 907699; Spent Fuel Rack Boral Specimen Surveillance, March 30, 2007
- Topical Report – Credit for 90% of the 10B in Boral, October 28, 2004
- IR 0438774; 2005 Modification and 50.59 FASA – Issues with EC 354059, May 25, 2005
- IR 0610890; SFP Boral Coupon Exceeds Areal Density Acceptance Criterion, March 30, 2007
- IR 0931482; SFP Boral Coupon Program Procedure Revision Needed, June 15, 2009
- IR 1425327; LR SFP Boral Coupon Schedule Not IAW License Amendment, October 11, 2012
- HI-982094; Criticality Evaluation for the Byron/Braidwood Rack Installation Project, Revision 1
- 0BVSF FH-1; Unit 0 Spent Fuel Rack Boral Specimen Surveillance, Revision 5
- IR 1178342; NOS ID: Old Adverse Corrective was Not In System IQ, February 22, 2011
- IR 1185023; Fire Protection Flow Not as Expected During Surveillance, March 8, 2011
- IR 1192929; 0FP250 Is the Suspected Disc-Stem Separated Valve, 3/27/2011
- IR 1198842; 1CV8369D Is Much Further Open than the Others, April 6, 2011
- IR 1245362; 2OG110A Failure Investigation, July 29, 2011
- IR 1322638; WG Regulating Valve No Raising Pressure, February 3, 2012
- IR 1378480; 1A HP Accumulator Low Pressure After Charging with N2, June 15, 2012
- IR 1419800; Secured 1B SI PP During 1BOSR 8.1.11-2 Test Due to High Temp., September 28, 2012
- IR 1423584; Outlet Valve 1SX2080B Did Not Function as Expected, October 7, 2012
- IR 1435550; 1LC-HD082: 1B 2<sup>nd</sup> Stage RHDT Level Controller, November 3, 2012

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

- IR 1417888; NRC Concerns with the SFP Racks Boral Coupon Tests, September 24, 2012
- IR 1453634; FUK-FHB Floor Pipe Penetration, December 18, 2012
- IR 1453636; FUK: Flooding and Seismic Walkdowns, December 18, 2012

- IR 1457919; LS-AA-115 Operating Experience Program Enhancement, January 03, 2013
- IR 1456381; Extent of Condition for Inappropriate TRM SPEC on Snubbers, December 28, 2012

**40A5: NRC Temporary Instruction (TI) 2515/187: (Flooding)**

- IR 1395377; FUK; Flood Minor Corrosion on RWST Tunnel Hatch 0DSH158, July 31, 2012
- IR 1395379; FUK; Flood Minor Corrosion on RWST Tunnel Hatch 0DSH159, July 31, 2012
- IR 1395416; FUK; Flood River Screen House 0SX02A Penetration Flood Seal, July 31, 2012
- IR 1395419; CAP Conduit Sleeves Outside 1B/1C MSIV Room, July 31, 2012
- IR 1395847; FUK; Flood Determine Long-Term Resolution of Drain Pipes, July 31, 2012
- IR 1395996; FUK; Flood Evidence of Past Water Intrusion 1A/2A SX PP Room, August 01, 2012
- IR 1395999; FUK; Flood Evidence of Past Water Intrusion 1B/2B SX PP Room, August 01, 2012
- IR 1396000; FUK; Flood Effect of Local Probable Maximum Precipitation (PMP), August 01, 2012
- IR 1404340; FUK; Top of Concrete Slab in Radwaste Building Below PMP Level, August 23, 2012
- IR 1414231; FUK; Remove/Re-install Steel PMP Curb 1A/1D MSIV RM, October 29, 2012
- IR 1432820; FUK; Remove/Re-install Steel PMP Curb 1A/1D MSIV RM, October 29, 2012
- IR 1432882; FUK; Submit Supplemental Seismic Walkdown Report, October 29, 2012
- IR 1444736; FUK; Available Physical Margin (APM) at Byron, November 27, 2012
- IR 1449179; FUK; Flex Equipment Needs Initial Maintenance Setup, December 7, 2012
- IR 1449193; FUK; Fukushima Flex Equipment Needs Labeling, December 7, 2012
- IR 1449324; FUK; New Fukushima Equipment Incorporation into Procedures, December 7, 2012
- IR 1452478; FUK; Impact of Probable Maximum Precipitation, December 14, 2012
- Schematic Diagram; Duplex Radwaste Drumming Station Sump Pumps 0A & 0B-0W202PA & B
- Diagram M-48; Miscellaneous Sumps & Pumps, Sheet 19
- Auxiliary Building Piping Plan; Elevation 383'-0" Byron/Braidwood Stations Unit 2, Revision K
- Plumbing Auxiliary Building Diagram Upper Basement Elevation 383'0" Area 3,4,6,
- Drawing A-663, Revision H
- Auxiliary Building Upper Basement Floor Plan Elevation 383'-0" Area 3, Sheet A-230
- Radwaste/Service Building Complex Ground Floor, Drawing S-616
- Radwaste/Service Building Complex Miscellaneous Plans, Sections and Details, Drawing S-623, Revision G
- Radwaste/Service Building Complex Radwaste Tunnel Feedwater Plan & Sections, Drawing S-612 – Revision U
- Walkdown Record Forms

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

- IR 1407641; NRC Identified Loose Bolt on Flood Barrier, August 31, 2012

**40A5: NRC Temporary Instruction 2515/188: (Seismic Walkdown)**

- IR 1396507; FUK; Flood Evidence of Past Water Intrusion Unit 1 346' Walls, August 2, 2012
- IR 1396509; FUK; Flood Evidence of Past Water Intrusion Unit 2 346' Walls, August 2, 2012

- IR 1396742; FUK: Flood Conduit in 1B/2B SX PP RM Needs Different Seal Type, August 1, 2012
- IR 1396746; FUK: Flood Conduit in 1B/2B SX PP RM Needs Different Seal Type, August 1, 2012
- IR 1397684; FUK: Screw Stripped on Back of 2PM05J, August 6, 2012
- IR 1397693; FUK: Seismic – S-Hooks/Chain Links Are Not Completely Closed, August 6, 2012
- IR 1397694; FUK: Seismic Unit 1 AEER Lighting, August 6, 2012
- IR 1397697; FUK: 2PM07J Rear Cover Thumb Screw Loose, August 6, 2012
- IR 1397699; FUK: MCR Lighting Diffuser Degraded, August 6, 2012
- IR 1397700; FUK: Replace Emergency Light Support Pan, August 6, 2012
- IR 1397702; FUK: Replace Cooling Unit Discharge Duct Tape, August 6, 2012
- IR 1397709; FUK: Gap Between AEER Cabinets, August 6, 2012
- IR 1397710; FUK: 0FP332 Valve Leaking By, August 6, 2012
- IR 1397711; FUK: Roof Drain Above 0VC01JA Potential Water Ingress, August 6, 2012
- IR 1398127; FUK: Seismic – S-Hooks/Chain Links are Not Completely Closed, August 7, 2012
- IR 1398177; FUK: Scaffold Installed in 1B DG Vent Plenum, August 7, 2012
- IR 1398191; FUK: 1A/D MSIV Room Floor Seal – Ground Level, August 7, 2012
- IR 1398568; FUK: Seismic - S-Hooks/Chain Links are Not Completely Closed, August 8, 2012
- IR 1398659; FUK: 1AP11E 131X Transformer Missing 2 Bolts on Top Cover, August 8, 2012
- IR 1398667; FUK: Boric Acid Leak at Pipe Cap Downstream of 1CV063, August 8, 2012
- IR 1399104; FUK: Seismic - S-Hooks/Chain Links are Not Completely Closed, August 9, 2012
- IR 1399377; FUK: S-Hooks DC Battery Room 111, August 10, 2012
- IR 1399380; FUK: S-Hooks DC Battery Room 112, August 10, 2012
- IR 1399383; FUK: S-Hooks DC Battery Room 211, August 10, 2012
- IR 1399385; FUK: S-Hooks DC Battery Room 212, August 10, 2012
- IR 1399405; FUK: Lighting S-Hooks Above 0SX02JB, August 10, 2012
- IR 1399420; FUK: Seismic 2VA01SA Cooler Has Crack on Grout Pad, August 10, 2012
- IR 1399436; FUK: Nuts Not Installed 0FIT-GW001, August 10, 2012
- IR 1399487; FUK: Main Control Room Panel Repair Fasteners, August 10, 2012
- IR 1399490; FUK: Main Control Room Panel Repair Fasteners, August 10, 2012
- IR 1399691; FUK: Need to Have FUK Team Evaluate MCR Ceiling Tiles, August 11, 2012
- IR 1399832; FUK: Seismic RP Cart Located Next to MCC 133X1A, August 10, 2012
- IR 1402551; FUK: Seismic Inspect Bus 142 Anchorage, August 20, 2012
- IR 1402729; FUK: 0WO01CA Has Crack on Grout Pad, August 20, 2012
- IR 1402735; FUK: 0WO01VB Has Indication of Crack on Grout Pad, August 20, 2012
- IR 1403131; FUK: Crack in 1" Group Pad of 1RH01PB at 2 of 3 Bolts, August 21, 2012
- IR 1403145; FUK: Crack in 1VA02SB Grout Pad, August 21, 2012
- IR 1403160; FUK: Leak on Diaphragm Identified During Walkdown, August 21, 2012
- IR 1403165; FUK: Boric Acid Build-up on 1B RH Bolts, August 21, 2012
- IR 1405498; FUK: Seismic Inspect Bus 241 Anchorage, August 27, 2012
- IR 1405501; FUK: Seismic Inspect Bus 231X Anchorage, August 27, 2012
- IR 1406870; NOS ID Cabinet Hinge Pins Not Fully Inserted in Hinge, August 30, 2012
- IR 1419018; FUK: Close GAP Between 1PA09J and 1PA11J, September 27, 2012
- IR 1431928; FUK: Seismic – Missing Screw on Duct Box From 1VE07S, October 26, 2012
- IR 1431973; FUK: Seismic – IPEEE Outlier, October 26, 2012
- IR 1436970; FUK: Follow-up Seismic Inspection MCC 131X1, November 7, 2012
- IR 1436972; FUK: Follow-up Seismic Inspection MCC 131X3, November 7, 2012
- IR 1436974; FUK: Follow-up Seismic Inspection MCC 132X3, November 7, 2012
- IR 1436975; FUK: Follow-up Seismic Inspection MCC 131X2, November 7, 2012
- IR 1436976; FUK: Follow-up Seismic Inspection MCC 132X2, November 7, 2012
- IR 1436978; FUK: Follow-up Seismic Inspection MCC 133X1A, November 7, 2012

- IR 1436982; FUK: Follow-up Seismic Inspection MCC 132Z1, November 7, 2012
- IR 1436986; FUK: Follow-up Seismic Walkdown MCC 131Z1, November 7, 2012
- IR 1436988; FUK: Follow-up Seismic Inspection U-Sub 132Z, November 7, 2012
- IR 1436989; FUK: Seismic Follow-up Inspection U-Sub 131Z, November 7, 2012
- IR 1436990; FUK: Follow-up Seismic Inspection MCC 231X2, November 7, 2012
- IR 1436993; FUK: Follow-up Seismic Inspection MCC 233X2, November 7, 2012
- IR 1436996; FUK: Follow-up Seismic Inspection MCC 233X1, November 7, 2012
- IR 1436999; FUK: Follow-up Seismic Inspection MCC 232Z1, November 7, 2012
- IR 1437001; FUK: Follow-up Seismic Inspection MCC 231Z1, November 7, 2012
- IR 1437003; FUK: Follow-up Seismic Inspection U-Sub 232Z, November 7, 2012
- IR 1444752; FUK: Seismic Walkdown 2PM11J Internal Divider Plate, November 27, 2012
- IR 1444756; FUK: Seismic Walkdown 1DC11J Thumbscrew, November 27, 2012
- IR 1444758; FUK: Seismic Walkdown 2DC10J Thumbscrew, November 27, 2012
- IR 1444836; FUK: Seismic Walkdown 2PA07 Loose Screw, November 27, 2012
- Byron SWEL Walkdown List, August 1, 2012
- Byron SWEL Walkdown List, August 9, 2012
- EC 378161; Revise the Design Bases to Accept Potential Voided Piping Downstream of the 1/2CS009A Valves and the 1/21881A/B Valves, October 22, 2010
- NAI-1459-001; Comparison of GOTHIC Gas Transport Calculations with Test Data, Revision 1

Corrective Action Documents As a Result of NRC Inspection

- IR 1398194; FUK: A Housekeeping Item Was Identified by the NRC, August 7, 2012
- IR 1399113; FUK: NRC Identified Housekeeping Issue, August 9, 2012

## LIST OF ACRONYMS USED

AC	Alternating Current
ACE	Apparent Cause Evaluation
ADAMS	Agencywide Document Access and Management System
AF	Auxiliary Feedwater
ASME	American Society of Mechanical Engineers
CAP	Corrective Action Program
CFR	Code of Federal Regulations
DAW	Dry Active Waste
EC	Engineering Change
EPIP	Emergency Plan Implementation Process
ESF	Engineered Safety Feature
ESFAS	Engineered Safety Feature Actuation System
FSAR	Final Safety Analysis Report
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Inspection Report/Issue Report
IST	Inservice Testing
JPM	Job Performance Measure
LER	Licensee Event Report
LORT	Licensed Operator Requalification Training
MSPI	Mitigating System Performance Index
NCV	Non-Cited Violation
NDCT	Natural Draft Cooling Tower
NEI	Nuclear Energy Institute
NRC	U.S. Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
ODCM	Offsite Dose Calculation Manual
OSP	Outage Safety Plan
OWA	Operator Workaround
PARS	Publicly Available Records System
PI	Performance Indicator
PIM	Plant Issues Matrix
PMP	Probable Maximum Precipitation
PPR	Plant Performance Review
RCS	Reactor Coolant System
RFO	Refueling Outage
RH	Residual Heat Removal System
SAT	Systems Approach to Training
SDP	Significance Determination Process
SI	Safety Injection
SSC	Structure, System, or Component
SWEL	Seismic Walkdown Equipment List
SX	Essential Service Water
TI	Temporary Instruction
TS	Technical Specification
TSO	Transmission System Operator
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
WO	Work Order

M. Pacilio

-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 (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 and NPF-66

Enclosure: Inspection Report No. 05000454/2012005; 05000455/2012005;  
w/Attachment: Supplemental Information

cc w/encl: Distribution via ListServ

DOCUMENT NAME: G:\DRPIII\BYRO\Byron 2012 005.docx

Publicly Available     Non-Publicly Available     Sensitive     Non-Sensitive

To receive a copy of this document, indicate in the concurrence box "C" = Copy without attach/encl "E" = Copy with attach/encl "N" = No copy

OFFICE	RIII						
NAME	RNg:ntp	EDuncan					
DATE	2/05/13	2/05/13					

**OFFICIAL RECORD COPY**

Letter to M. Pacilio from E. Duncan dated February 5, 2013.

SUBJECT: BYRON STATION, UNITS 1 AND 2, NRC INTEGRATED INSPECTION  
REPORT 05000454/2012005; 05000455/2012005

DISTRIBUTION:

John Cassidy  
RidsNrrDorLp13-2 Resource  
RidsNrrPMByron Resource  
RidsNrrDirslrib Resource  
Chuck Casto  
Cynthia Pederson  
Steven Orth  
Allan Barker  
Christine Lipa  
Carole Ariano  
Linda Linn  
DRPIII  
DRSIII  
Tammy Tomczak  
[ROPreports.Resource@nrc.gov](mailto:ROPreports.Resource@nrc.gov)