



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION III
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May 10, 2013

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

SUBJECT: ERRATUM FOR BYRON STATION, UNITS 1 AND 2, NRC INTEGRATED
INSPECTION REPORT 05000454/2013002; 05000455/2013002

Dear Mr. Pacilio:

On April 30, 2013, the U. S. Nuclear Regulatory Commission (NRC) issued Integrated Inspection Report 05000454/2013002, 05000455/2013002 for your Byron Station (ML13120A181). The inspection section related to Temporary Instruction (TI) 188, "Inspection of Near-Term Task Force Recommendation 2.3 Seismic Walkdowns," was inadvertently omitted in the original report.

This erratum encloses a complete report reissued with the omitted inspection section. Please disregard the previously transmitted report. We regret any inconvenience this may cause.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records System (PARS) component of NRC's Agencywide Documents 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).

M. Pacillo

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Should you have any questions concerning this erratum, we will be pleased to discuss them with you.

Sincerely,

/RA/

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

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

Enclosure: Erratum for Inspection Report 05000454/2013002 and 05000455/2013002
w/Attachment: Supplemental Information

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U. S. NUCLEAR REGULATORY COMMISSION

REGION III

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

Report No: 05000454/2013002; 05000455/2013002

Licensee: Exelon Generation Company, LLC

Facility: Byron Station, Units 1 and 2

Location: Byron, IL

Dates: January 1 through March 31, 2013

Inspectors: B. Bartlett, Senior Resident Inspector
J. Robbins, Resident Inspector
J. Bozga, Reactor Inspector
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Approved by: E. Duncan, Chief
Branch 3
Division of Reactor Projects

Enclosure

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SUMMARY OF FINDINGS

Inspection Report (IR) 05000454/2013002 and 05000455/2013002; 01/01/2013 - 03/31/2013; Byron Station, Units 1 & 2; Identification and Resolution of Problems; Other Activities.

This report covers a 3-month period of inspection by resident inspectors and announced baseline inspections by regional inspectors. Based on the results of this inspection, two NRC-identified findings of very low safety significance (Green) were identified. One of these findings had an associated Non-Cited Violation (NCV) 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) dated June 2, 2011. Cross-cutting aspects are determined using IMC 0310, "Components Within the Cross-Cutting Areas," dated October 28, 2011. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy dated January 28, 2013. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process (ROP)," Revision 4.

A. NRC-Identified and Self-Revealed Finding

Cornerstone: Mitigating Systems

- Green. The inspectors identified a finding of very low safety significance (Green) and an associated non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," when licensee personnel failed to properly evaluate the structural steel embedment plate which supported Safety Injection (SI) pipe supports 1SI06025V and 1SI06030S. Specifically, the licensee failed to demonstrate compliance with the American Institute of Steel Construction (AISC) and Seismic Category I linear elastic requirements. The licensee entered this issue into their corrective action program (CAP) as Issue Report (IR) 1478188. As part of their immediate corrective actions, the licensee performed an operability evaluation and concluded the structural steel embedment plate was operable, but nonconforming.

The inspectors determined that the performance deficiency was more than minor because it was associated with the Design Control attribute 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, the licensee failed to demonstrate compliance with AISC and Seismic Category I linear elastic requirements to ensure the structural steel embedment plate would maintain structural integrity when subjected to a design basis load. The inspectors determined that because the finding did not result in a loss of operability or functionality, the finding was of very low safety significance (Green). This finding did not have a cross-cutting aspect as it was not indicative of current performance. (Section 4OA2.3)

- Green. The inspectors identified a finding of very low safety significance (Green) when licensee personnel failed to develop inspection lists that included all external flood protection features credited in current licensing bases (CLB) documents as specified in Nuclear Energy Institute (NEI) 12-07, "Guidelines for Performing Walkdowns of Plant Flood Protection Features." Specifically, concrete flood barriers in the fuel handling building (FHB) that protected safety-related equipment in the auxiliary building and flood barriers for the spent fuel pool cooling pumps were not included in the licensee's

flooding inspection lists, although these passive components were a critical element of the licensee's flood mitigation strategy. The licensee entered this issue into their CAP as IR 1466355. Corrective actions included plans to perform an inspection of the NRC-identified features that were omitted from the inspection lists and an extent-of-condition review.

The inspectors determined that the performance deficiency was more than minor because it was associated with the Protection Against External Factors (Flood Hazard) attribute 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). Because the finding did not involve the loss or degradation of equipment or function specifically designed to mitigate a seismic, flooding, or severe weather initiating event (e.g., seismic snubbers, flooding barriers, tornado doors), the finding was of very low safety significance (Green). This finding had a cross-cutting aspect in the Work Practices component of the Human Performance cross-cutting area because licensee personnel failed to properly apply human error prevention techniques such as peer checking and proper documentation of activities [H.4(a)]. (Section 4OA5.2)

B. Licensee-Identified Violations

None.

REPORT DETAILS

Summary of Plant Status

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

Unit 2 operated at or near full power throughout most of the inspection period. On March 20, 2013, at approximately 7:51 p.m., the Unit 2 reactor was manually tripped when the only available generator stator cooling water pump failed. All equipment operated as expected with a few minor exceptions. Unit 2 returned to full power operation on March 25, 2013, after the pump was repaired and returned to service.

1. REACTOR SAFETY

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

1R01 Adverse Weather Protection (71111.01)

.1 External Flooding

a. Inspection Scope

The inspectors evaluated the design, material condition, and procedures for coping with the design bases probable maximum flood. The evaluation included a review to check for deviations from the descriptions provided in the Updated Final Safety Analysis Report (UFSAR) for features intended to mitigate the potential for flooding from external factors. As part of this evaluation, the inspectors checked for obstructions that could prevent draining, checked that the roofs did not contain obvious loose items that could clog drains in the event of heavy precipitation, and determined whether barriers required to mitigate flooding were in place and operable. Additionally, the inspectors performed a walkdown of the protected area to identify any modification to the site which could inhibit site drainage during a probable maximum precipitation event or allow water ingress past a flood barrier. The inspectors also walked down underground bunkers/manholes subject to flooding that contained multiple trains or multiple function risk-significant cables. The inspectors also reviewed the abnormal operating procedure for mitigating the design bases flood to ensure it could be implemented as written. Specific areas inspected included the Unit 1 emergency diesel generators, main steam tunnels, and the fuel handling building (FHB).

This inspection constituted one external flooding sample as defined in Inspection Procedure (IP) 71111.01-05.

b. Findings

Findings identified during this inspection are documented in Section 4OA5, "Other Activities."

1R04 Equipment Alignment (71111.04)

.1 Quarterly Partial System Walkdowns

a. Inspection Scope

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

- Unit Common Train 'A' Control Room Chiller with Train 'B' Control Room Chiller Out of Service for Maintenance;
- Unit 2 Instrument Inverter 212 with Instrument Inverter 214 Out of Service for Maintenance; and
- Unit 2 Train 'A' Essential Service Water (SX) with Unit 2 Train 'B' SX Out of Service for 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 corrective action program (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 the availability, accessibility, and the condition of firefighting equipment in the following risk-significant plant areas:

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

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 four quarterly fire protection inspection samples as defined in IP 71111.05-05.

b. Findings

No findings were identified

1R06 Flooding (71111.06)

.1 Internal Flooding

a. Inspection Scope

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

sumps were clear of debris and were operable, and that the licensee complied with existing commitments:

- Unit 1 and Unit 2 SX Pump Rooms

Documents reviewed are listed in the Attachment. This inspection constituted one internal flooding sample as defined in IP 71111.06-05.

b. Findings

No findings were identified.

1R11 Licensed Operator Regualification Program (71111.11)

.1 Resident Inspector Quarterly Review (71111.11Q)

a. Inspection Scope

On January 31, 2013, the inspectors observed a crew of licensed operators in the plant simulator during licensed operator regualification 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, procedural compliance, 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 regualification 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 March 12, 2013, the inspectors observed control room operators during the emergent failure of Unit 1 core exit thermocouple 50, and on March 22, 2013, the inspectors observed plant startup following the Unit 2 forced outage. These were activities 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 crew's performance in these areas was compared to pre-established operator action expectations, procedural compliance, and successful critical task completion requirements. Documents reviewed are listed in the Attachment.

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

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12)

.1 Routine Quarterly Evaluations (71111.12Q)

a. Inspection Scope

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

- Failure of Unit 1 Power Range Channel N43; and
- Review of Maintenance Rule Assessment for the Period of January 2011 to June 2012.

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

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

b. Findings

No findings were identified.

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

.1 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

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

- Unit 2 Train 'A' Charging Pump Emergent Failure with the Unit 1 Train 'A' SX Pump Out of Service for Planned Maintenance;
- Unit 1 Power Range Channel N43 Emergent Failure with Unit 2 Train 'B' SX Inoperable for Planned Maintenance; and
- Unit 1 Train 'B' Auxiliary Feedwater Pump Work Window.

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.

This inspection constituted three 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 1 Division 111 Battery Racks Support Questions;
- Capacity of Pressurizer Power Operated Relief Valve (PORV) Air Accumulators During Natural Circulation Cooldown;

- Operation of SX Pump with Single Cubical Cooler; and
- Unit 1 Power Range Channel N43 TS 3.3.1.D Entry.

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 four operability inspection samples as defined in IP 71111.15-05.

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18)

.1 Plant Modifications

a. Inspection Scope

The inspectors reviewed the following modification:

- Reactor Containment Fan Cooler (RCFC) Check Dampers Closure Spring Changes

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

This inspection constituted one permanent plant 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:

- Unit 1 Bus 144 Breaker 1442 Following Lockout Relay Replacement;
- Unit 1 Train 'A' SX Cubical Coolers Following Repairs;
- Unit 2 Instrument Inverter 214 Following Coil Replacement; and
- Unit 2 Train 'B' Generator Stator Water Cooling System Pump Following Motor Replacement.

These activities were selected based upon the structure, system, and component's (SSC's) ability to impact risk. The inspectors evaluated these activities for the following (as applicable): the effect of testing on the plant had been adequately addressed; testing was adequate for the maintenance performed; acceptance criteria were clear and demonstrated operational readiness; test instrumentation was appropriate; tests were performed as written in accordance with properly reviewed and approved procedures; equipment was returned to its operational status following testing (temporary modifications or jumpers required for test performance were properly removed after test completion); and test documentation was properly evaluated. The inspectors evaluated the activities against TSs, the UFSAR, 10 CFR Part 50 requirements, licensee procedures, and various NRC generic communications to ensure that the test results adequately ensured that the equipment met the licensing bases and design requirements. In addition, the inspectors reviewed corrective action documents associated with post-maintenance tests to determine whether the licensee was identifying problems and entering them into the CAP at the appropriate threshold and that the problems were being corrected commensurate with their importance to safety. Documents reviewed are listed in the Attachment.

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

b. Findings

No findings were identified.

1R20 Outage Activities (71111.20)

.1 Unit 2 Forced Outage

a. Inspection Scope

On March 20, 2013, at 7:51 p.m., licensee personnel performed a manual trip of the Unit 2 reactor. The reactor was manually tripped in accordance with site procedures when the only operating and available electrical generator stator cooling water pump tripped unexpectedly. The inspectors responded to the site and assessed the cause of the trip, performed follow-up inspection of minor equipment failures, and immediately communicated any observations to NRC management. The inspectors reviewed outage equipment configuration and risk management, verified electrical lineups, monitored decay heat removal, observed reactor startup activities, and reviewed the identification and resolution of problems associated with the forced outage.

All safety-related equipment operated as designed. Some nonsafety-related equipment experienced minor malfunctions. For example:

- The 'B' reactor trip breaker closed indication light extinguished as expected, however the open indication light did not illuminate to indicate that the breaker was open. An operator was dispatched and verified the breaker was open. Subsequently, a burned out 'B' reactor trip breaker open indication light bulb was replaced.
- The control rod in position M-12 (control bank D) had a general warning light flashing, although its associated rod bottom light was lit. Following troubleshooting, a logic card was replaced in the control rod drive cabinet to address the issue.
- Following the Unit 2 trip, light smoke was reported to be coming from the Unit 2 'A' main feedwater pump motor. It was later determined that when the 2A main feedwater pump was shut down that its associated motor heater automatically energized. An abnormally large amount of dust had built up on the heater and when it energized the dust "burned off."

The licensee addressed these issues and Unit 2 was restarted and synchronized to the electrical grid on March 22, 2013.

Documents reviewed are listed in the Attachment. This inspection constituted one other outage sample as defined in IP 71111.20-05.

b. Findings

No findings were identified.

.2 Unit 2 Refueling Outage

a. Inspection Scope

The inspectors reviewed the Outage Safety Plan and contingency plans for the Unit 2 refueling outage (RFO) that began on April 7, 2013, to confirm that the licensee had appropriately considered risk, industry operating experience, and previous site specific

problems in developing and implementing a plan that assured maintenance of defense in depth.

A complete list of accomplished inspection activities will be documented following completion of the Unit 2 RFO.

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

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22)

.1 Surveillance Testing

a. Inspection Scope

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

- Unit 1 Train 'B' Containment Spray Pump Quarterly Surveillance;
- Unit 1 Train 'A' Diesel Generator Operability Surveillance;
- Unit 1 Train 'A' Solid State Protection System Surveillance;
- Unit 2 K636 Engineered Safety Features (ESF) Relay Surveillance; and
- Unit 2 K644 ESF 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 in-service testing 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 five routine surveillance testing samples as defined in IP 71111.22, Sections -02 and -05.

b. Findings

No findings were identified.

1EP6 Drill Evaluation (71114.06)

.1 Training Observation

a. Inspection Scope

The inspectors observed a simulator training evolution for licensed operators on January 31, 2013, which required Emergency Plan implementation by a licensee operations crew. This evolution was planned to be evaluated and included in performance indicator data regarding drill and exercise performance. The inspectors observed event classification and notification activities performed by the crew. The inspectors also attended the post-evolution critique for the scenario. The focus of the inspectors' activities was to note any weaknesses and deficiencies in the crew's performance and ensure that the licensee evaluators noted the same issues and entered them into the CAP. As part of the inspection, the inspectors reviewed the scenario package and other documents listed in the Attachment.

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

b. Findings

No findings were identified.

2. RADIATION SAFETY

2RS4 Occupational Dose Assessment (71124.04)

This inspection constituted a partial sample as defined in IP 71124.04-05.

.1 External Dosimetry (02.02)

a. Inspection Scope

The inspectors evaluated whether the licensee's dosimetry vendor is National Voluntary Laboratory Accreditation Program (NVLAP) accredited and if the approved irradiation test categories for each type of personnel dosimeter used were consistent with the types and energies of the radiation present and the way the dosimeter was being used (e.g., to measure deep dose equivalent, shallow dose equivalent, or lens dose equivalent).

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 first quarter 2012 through the fourth 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 January 2012 through December 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 2012 through the fourth 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 and NRC Integrated Inspection Reports for the period of January 2012 through December 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 with complications samples as defined in IP 71151-05.

b. Findings

No findings were identified.

.3 Unplanned Power Changes Per 7000 Critical Hours

a. Inspection Scope

The inspectors sampled licensee submittals for the Unplanned Power Changes Per 7000 Critical Hours PI for Unit 1 and Unit 2 for the period from the first quarter 2012 through the fourth 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, maintenance rule records, event reports, and NRC Integrated Inspection Reports for the period of January 2012 through December 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 power changes per 7000 critical hours 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 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.

.3 Selected Issue Follow-Up Inspection: Actions to Address Engineering-Related Issues Identified at Braidwood During NRC Inspections

a. Inspection Scope

The inspectors reviewed evaluations and calculations as well as related IRs to assess the adequacy of the licensee's extent-of-condition review of issues identified during the Braidwood Station Unit 1 and Unit 2 Evaluation of Changes, Tests, or Experiments and Permanent Plant Modifications inspections performed in 2011.

This review included an analysis that was performed by the licensee to determine the effects of lead shielding on the Unit 1 Safety Injection (SI) system piping subsystem and associated pipe supports.

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

b. Findings

Embedment Plate Design Deficiencies

Introduction: The inspectors identified a finding of very low safety significance (Green) and an associated Non-Cited Violation (NCV) of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," when licensee personnel failed to properly evaluate the structural steel embedment plate which supported SI pipe supports 1SI06025V and 1SI06030S.

Description: The SI system is part of the emergency core cooling system (ECCS). Section 6.3.1 of the Byron UFSAR stated, in part, that the primary function of the ECCS is to remove the stored and fission product decay heat from the reactor during accident conditions and provide shutdown capability for design basis accidents by means of boron injection.

Piping Subsystem 1SI06 is part of the SI System and is a safety-related ASME Class II, Seismic Category I subsystem located in the curved wall area of the auxiliary building. A structural steel embedment plate that supports safety-related pipe supports 1SI06025V and 1SI06030S is located in the auxiliary building, which is a Seismic Category I structure. Section 3.8.4.5.2 of the UFSAR describes requirements for structural steel design inside the auxiliary building and states, in part, "The stresses and strains of structural steel are limited to those specified in the AISC (American Institute of Steel Construction)..." Also, this section required that stresses be held within the elastic range and that no plastic deformation was allowed.

The inspectors reviewed Calculation No. 13.2.29BY, "Mechanical Component Support 1SI06025V," Revision 2X that evaluated pipe supports 1SI06025V and 1SI06030S. These supports were attached to a structural embedment plate in the auxiliary building. The structural steel embedment plate evaluation was also included in this calculation.

During a review of Calculation No. 13.2.29BY, the inspectors identified a number of concerns, including the following:

- The calculated bending stress on the embedment plate was greater than the allowable bending stress by about 67 percent and the licensee relied on engineering judgment to demonstrate compliance with the design and licensing basis requirements;
- The calculation used the actual instead of minimum material yield stress of the embedment plate to calculate the allowable bending stress;
- The calculation used an acceptance criteria which permitted plastic or permanent deformation through yielding of the structural steel embedment plate and redistribution of stresses in the embedment plate due to applied loads;
- The calculation did not include an evaluation for severe environmental load combinations as described in UFSAR Table 3.8-9 and as described in UFSAR Section 3.8.4.3, "Loads and Loading Combinations;" and
- The calculation did not consider applied stresses due to self-weight and self-weight seismic excitation of tube steel pipe support members.

The inspectors determined that the engineering judgment used to demonstrate compliance with the design and licensing basis was not valid because the AISC required that the allowable bending stress be determined using the minimum yield stress of the material. In addition, UFSAR Section 3.8.4.5.2 specified no plastic or permanent deformation due to applied stresses. The inspectors also identified that the structural steel embedment plate was not qualified for the severe environmental load combination as described in UFSAR Table 3.8-9 and as required by UFSAR Section 3.8.4.3.

The licensee entered this issue into their CAP as IR 1478188, "NRC Identified Use of CMTR in a 80's Calculation." As part of their immediate corrective actions, the licensee performed an operability evaluation and concluded the structural steel embedment plate was operable, but nonconforming.

Analysis: The inspectors determined that the failure to design the structural steel embedment plate which supported pipe supports 1SI06025V and 1SI06030S in accordance with AISC and Seismic Category I linear elastic requirements was a performance deficiency.

The inspectors determined that the performance deficiency was more than minor because it was associated with the Design Control attribute 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, the licensee did not demonstrate that the structural steel embedment plate which supported pipe supports 1SI06025V and 1SI06030S would maintain structural linear elastic integrity when subjected to design loads.

The inspectors reviewed Attachment 0609.04, "Initial Characterization of Findings," Table 3 – SDP Appendix Router. The inspectors answered 'No' to all of the questions in Sections A through E of Table 3 and therefore the finding was evaluated using the SDP in accordance with IMC 0609, "The Significance Determination Process (SDP) for Findings At-Power," Appendix A, Exhibit 2, "Mitigating Systems Screening Questions."

The inspectors answered 'Yes' to Question 1 - If the finding is a deficiency affecting the design or qualification of a mitigating SSC [Structure, System, or Component], does the SSC maintain its operability or functionality? Specifically, the design deficiency was confirmed not to result in a loss of operability of the structural steel embedment plate. Therefore, the finding was determined to have very low safety significance (Green). The inspectors performed an independent review of the operability evaluation and had no further concerns.

The inspectors did not identify a cross-cutting aspect associated with this finding because the calculation was from the 1980's and was therefore not representative of current performance.

Enforcement: Title 10 CFR Part 50, Appendix B, Criterion III, "Design Control," requires, in part, that design control measures shall provide for verifying or checking the adequacy of the design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program.

Piping Subsystem 1SI06 is part of the Safety Injection System and is a safety-related ASME Class II, Seismic Category I subsystem located in the curved wall area of the auxiliary building. A structural steel embedment plate that supports safety-related pipe supports 1SI06025V and 1SI06030S is located in the auxiliary building, which is a Seismic Category I structure. Section 3.8.4.5.2 of the UFSAR describes requirements for structural steel design inside the auxiliary building and states, in part, "The stresses and strains of structural steel are limited to those specified in the AISC...." Also, Section 3.8.4.5.2 of the UFSAR required that stresses be within the elastic range and that no plastic deformation was allowed.

Contrary to the above, from initial construction to February 21, 2013, the licensee failed to demonstrate the design adequacy of the embedment plate which supported safety-related Safety Injection pipe supports 1SI06025V and 1SI06030S. Specifically, the design for the structural steel embedment plate which supported safety-related Safety Injection pipe supports 1SI06025V and 1SI06030S was inadequate, in that Calculation No. 13.2.29BY, "Mechanical Component Support 1SI06025V," Revision 2X, which was a quality calculation, did not demonstrate that the embedment plate would meet AISC and Seismic Category I linear elastic requirements.

Because this violation was of very low safety significance and it was entered into the licensee's CAP as IR 1478188, this violation is being treated as a NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy. As part of their immediate corrective actions, the licensee performed an operability evaluation and concluded the structural steel embedment plate was operable. **(NCV 05000454/2013002-01, "Embedment Plate Design Deficiencies")**

.4 Selected Issue Follow-Up Inspection: Valves in LCO Due to Abandonment

a. Inspection Scope

During a review of items entered in the licensee's CAP, the inspectors identified an IR regarding equipment that had been abandoned in place. Specifically, IR 1306607, "Long Term LCO [Limiting Condition for Operation] Extent of Condition Review Per IR 1298667," characterized a series of valves as abandoned. The valves were also

characterized as having a containment isolation function. The inspectors reviewed the licensees' procedures associated with containment leak rate testing and recent test data to ensure that the performance of the abandoned valves remained acceptable.

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

b. Findings

No findings were identified.

4OA5 Other Activities

.1 (Closed) NRC Temporary Instruction (TI) 2515/187 – "Inspection of Near-Term Task Force Recommendation 2.3 Flooding Walkdowns"

As discussed in NRC Integrated Inspection Report 05000454/2012005; 05000455/2012005, the inspectors previously verified that 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 specified in Nuclear Energy Institute (NEI) 12-07, "Guidelines for Performing Walkdowns of Plant Flood Protection Features."

During the previous quarter, the inspectors accompanied the licensee on their walkdown of the 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.
- Flood protection feature functionality was determined using either visual observation or by review of other documents.

During this quarter, the inspectors conducted additional independent walkdowns to verify licensee compliance with inspection guidance contained in TI 2515/187. The area selected was the building that houses the spent fuel pool, the fuel handling building (FHB). There were several reasons for selecting this area. For example, the spent fuel pool filtering and heat removal systems are located in the FHB. In addition, the FHB has access ways that lead to other portions of the auxiliary building, a safety-related structure.

The Byron UFSAR identified that the FHB was not subject to flooding. The inspectors questioned why the FHB would not be subject to flooding since portions of it are at ground level, a roll-up door in this building leads to an adjacent structure which has a

roll-up door that leads outside, and railway channels in the FHB have been observed to contain rain water.

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.

.2 Failure to Properly Scope All the Pertinent External Flood Protection Features into Walkdown Lists in Accordance with Nuclear Energy Institute (NEI) 12-07

Introduction: The inspectors identified a finding of very low safety significance (Green) when licensee personnel failed to develop inspection lists that included all external flood protection features credited in current licensing bases (CLB) documents as specified in NEI 12-07, "Guidelines for Performing Walkdowns of Plant Flood Protection Features." Specifically, the inspection lists did not include several passive components in the FHB which were an essential element of the Byron flood mitigation strategy.

Description: The inspectors reviewed the licensee's inspection and walkdown documents associated with flooding reviews performed in accordance with NEI 12-07, "Guidelines for Performing Walkdowns of Plant Flood Protection Features," in response to a letter from the NRC to licensees pursuant to 10 CFR 50.54(f). During the review, the inspectors identified that the licensee had completed their scoping of components for TI 2515/187, "Inspection of Near-Term Task Force Recommendation 2.3 Flooding Walkdowns," and failed to properly scope all flood protection features credited in the CLB documents for flooding events. Specifically, while reviewing the Flooding Features Walkdown List used to inspect and test design bases flood mitigating equipment in accordance with the NRC-endorsed guidance of NEI 12-07, the inspectors identified that the flood protection features in the FHB were not included. The flood protection features in the FHB were designed to protect the auxiliary building, including residual heat removal and containment spray pumps from site external flooding scenarios, and were an essential part of the Byron design basis flood mitigation strategy. In particular, the concrete steps inside the FHB were designed to prevent flood waters that enter the FHB from reaching a door that would allow water to enter the auxiliary building.

Because the licensee did not adequately follow the guidance in NEI 12-07 and identify components in the FHB that served as passive flooding barriers, these components were not scheduled for visual inspections or walkdowns. As a result, the licensee failed to recognize walkdowns of these passive flooding barriers were required to adequately respond to the March 12, 2012 letter from the NRC to licensees that discussed these reviews. The licensee acknowledged that they may not have identified these flood barriers during subsequent reviews if the inspectors had not identified the issue.

The licensee entered this issue into their CAP as IR 1466355, "Update UFSAR Regarding External Flooding." Corrective actions included plans to perform an inspection of the NRC-identified passive flooding features that were omitted from the inspection lists and an extent-of-condition review.

Analysis: The inspectors determined that the failure to include concrete flood barriers in the FHB in the flooding inspection lists developed to address NEI 12-07, although these passive components were a critical element of the Byron flood mitigation strategy, was a performance deficiency.

Using the guidance in IMC 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Screening," the inspectors determined this finding affected the Mitigating Systems Cornerstone. The inspectors determined that the performance deficiency was more than minor because it was associated with the Protection Against External Factors (Flood Hazard) attribute 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, the concrete flood barriers in the FHB protecting important safety-related equipment in the auxiliary building as well as the flood barriers for the spent fuel pool cooling pumps were not properly scoped into the licensee's walkdown lists.

The inspectors reviewed Attachment 0609.04, "Initial Characterization of Findings," Table 3 – SDP Appendix Router. The inspectors answered 'No' to all of the questions in Sections A through E of Table 3 and therefore the finding was evaluated using the SDP in accordance with IMC 0609, "The Significance Determination Process (SDP) for Findings At-Power," Appendix A, Exhibit 2, "Mitigating Systems Screening Questions." The inspectors answered 'No' to Question B for the External Event Mitigation Systems – Does the finding involve the loss or degradation of equipment or function specifically designed to mitigate a seismic, flooding, or severe weather initiating event (e.g., seismic snubbers, flooding barriers, tornado doors)? Therefore, the finding was determined to have very low safety significance (Green).

This finding had a cross-cutting aspect in the Work Practices component of the Human Performance cross-cutting area because licensee personnel did not properly apply human error prevention techniques such as peer checking and proper documentation of activities [H.4(a)].

Enforcement: This finding did not involve enforcement action because no violation of a regulatory requirement was identified. Because this finding does not involve a violation and is of very low safety significance, it is identified as a finding (FIN). **(FIN 05000454/2013002-02; 05000455/2013002-02, Failure to Properly Scope All Pertinent External Flood Protection Features into Walkdown Lists in Accordance with Industry Guidance NEI 12-07)**

.3 (Closed) Unresolved Item 05000454/2011005-03; 05000455/2011005-03: Use of Thermoluminescent Dosimeters May Not Be Consistent With the Methods Used By the National Voluntary Laboratory Accreditation Program Accreditation Process

In the fourth quarter of 2011, the inspectors identified that the licensee's use of thermoluminescent dosimeters (TLDs) may not be consistent with the methods used by the NVLAP accreditation process. Specifically, the licensee used a vendor to supply and process dosimeters that measure radiation exposure for the monitored workers. This vendor is NVLAP-accredited for beta, gamma, neutron, mixture of beta/gamma, and mixture of neutron/gamma radiations. However, the licensee used the TLDs when workers may be exposed to beta, gamma, and neutron radiations within the same

monitoring period. The inspectors determined that this mixture of three radiation types may not be aligned with the accreditation process, and opened Unresolved Item (URI) 05000454/2011005-03; 05000455/2011005-03 to evaluate the issue. The inspectors requested technical assistance from the Office of Nuclear Reactor Regulation (NRR) through Task Interface Agreement (TIA) 2012-05 (ML 12268A330), the results of which are discussed below.

Title 10 CFR 20.1501(c)(2) requires that the dosimeter processor be approved for the type of radiation or radiations included in the NVLAP program that most closely approximates the type of radiation or radiations for which the individual wearing the dosimeter is monitored. As there is no NVLAP test category for dosimeters exposed to a mixture of beta, gamma, and neutron radiations, the NRC has determined that licensees, which monitor for beta, gamma, and neutron exposure with a single dosimeter, need to use a processor that is NVLAP accredited in categories for beta-photon mixtures and neutron-photon mixtures. The licensee's dosimetry processor was NVLAP accredited for both beta-photon and neutron-photon mixtures and therefore was in compliance with 10 CFR 20.1501(c)(2).

Notwithstanding the paragraph above, licensees are required to provide adequate monitoring in accordance with 10 CFR 20.1502(a). For any type of in-field use practice that can introduce error in the monitoring results (dependent upon the type of dosimeter and processing method), it becomes a question of compliance with the monitoring requirements of 10 CFR 20.1502(a) and not of NVLAP accreditation requirements of 10 CFR 20.1501(c)(2). As described in TIA 2012-05, another licensee had performed a study with the same dosimeters used by Byron (Harshaw 760). This study demonstrated that exposing a single Harshaw 760 dosimeter to a mixture of beta, gamma, and neutron radiation met industry standards for accuracy and precision. Therefore, the licensee provided adequate monitoring and was in compliance with 10 CFR 20.1502(a).

The inspectors determined that no performance deficiency existed; therefore this URI is closed.

.4 (Closed) NRC Temporary Instruction 2515/188 - Inspection of Near Term Task Force Recommendation 2.3 Seismic Walkdowns

As discussed in NRC Integrated Inspection Report 05000454/2012005; 05000455/2012005, 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:

- Anchorages were free of bent, broken, missing or loose hardware;
- Anchorages were free of corrosion that was more than mild surface oxidation;
- Anchorages were 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).

During this inspection period, the inspectors performed independent walkdowns and verified that the following areas or components were properly inspected:

- Unit 1 Safety-Related 125 Volt Direct Current (VDC) Battery Rooms;
- Unit 2 Safety-Related 125 Vdc Battery Rooms;
- "A" Train of Essential Service Water Cooler Tower Electrical Equipment Rooms;
- Unit 2 Mechanical Electrical Equipment Room; and
- Unit 2 Main Control Room Ventilation Room.

Observations made during the walkdowns that could not be determined to be acceptable were entered into the license'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) and these items were walked down by the licensee. This TI is closed.

4OA6 Management Meetings

.1 Exit Meeting Summary

On April 4, 2013, the inspectors presented the inspection results to Mr. B. Youman, Byron Plant Manager, and other members of the licensee's 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

- The inspection results for the area of occupational dose assessment were discussed with Mr. B. Burton, Radiation Protection Manager, on March 26, 2013.
- The inspection results for the area of lead shielding and pipe supports were discussed with Ms. A. Corrigan, Mechanical Design Manager, and Mr. E. Blondin, Design Engineering Manager, on March 26, 2013.

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

R. Kearney, Site Vice President
B. Youman, Plant Manager
B. Askren, Security Manager
B. Barton, Radiation Protection Manager
S. Briggs, Operations Director
A. Creamean, Chemistry Manager
S. Gackstetter, Training Manager
D. Gudger, Regulatory Assurance Manager
E. Hernandez, Engineering Director
D. Horstmann, Business Operations
B. Spahr, Maintenance Director
E. Topping, Nuclear Oversight Manager

Nuclear Regulatory Commission

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

Illinois Emergency Management Agency (IEMA)

R. Zuffa, IEMA

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

05000454/2013002-01	NCV	Embedment Plate Design Deficiencies (Section 4OA2.3)
05000454/2013002-02; 05000455/2013002-02	FIN	Failure to Properly Scope All Pertinent External Flood Protection Features into Walkdown Lists in Accordance with Industry Guidance NEI 12-07 (Section 4OA5.2)

Closed

05000454/2013002-01	NCV	Embedment Plate Design Deficiencies (Section 4OA2.3)
05000454/2013002-02; 05000455/2013002-02	FIN	Failure to Properly Scope All Pertinent External Flood Protection Features into Walkdown Lists in Accordance with Industry Guidance NEI 12-07 (Section 4OA5.2)
TI 2515/187	TI	Inspection of Near-Term Task Force Recommendation 2.3 Flooding Walkdown (Section 4OA5.1)
05000454/2011005-03; 05000455/2011005-03	URI	Use of TLDs May Not Be Consistent With the Methods Used by the NVLAP Accreditation Process (Section 4OA5.3)
TI 2515/188	TI	Inspection of Near-Term Task Force Recommendation 2.3 Seismic Walkdown (Section 4OA5.4)

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 1R04

- BOP WO-E4; Control Room Chilled Water Electrical Lineup, Revision 2
- BOP WO-M3; Control Room Chilled Water Valve Lineup, Revision 10

Section 1R06

- BAR 0PL02J-3-B2; ESW Sump 2 Level High High, Revision 52
- IR 1413893; Unit 1 SX Alpha Sump Pump Check Valve is Sticking Open, September 16, 2012
- M-48; Diagram of Miscellaneous Sumps and Pumps, Revision AE

Section 1R11

- IR 1486687; Unexpected Unit 1 PDMS Alarms Due to Failing CETC, March 12, 2012

Section 1R12

- IR 1487650; Potential Corporate Elevation for Byron Maintenance, March 12, 2013
- IR 1479105; Unit 1 Gain POT R303 for N-43 Not Functioning Properly, February 22, 2013
- Byron Station Maintenance Rule Expert Panel Meeting Notes, November 5, 2009
- Byron Station Maintenance Rule Expert Panel Meeting Notes, December 18, 2009
- Byron Station Maintenance Rule Expert Panel Meeting Notes, June 7, 2011
- Byron Station Maintenance Rule Expert Panel Meeting Notes, November 3, 2011
- IR 1214163; Common Cause Analysis for MCCB for MCC 134Y2-A4, June 2, 2011
- ER-AA-310-1005; (A)(1) Determination Template for IR 1207922, Revision 5
- ER-AA-310-1005; (A)(1) Determination Template for IR 1207931, Revision 5
- Byron Station Maintenance Rule Periodic Assessment #11, January 2011 – June 2012

Section 1R13

- IR 1474028; 2A CV Pump Gear Box Failed to Develop Oil Pressure on Start, February 12, 2013
- IR 1474042; 2A CV Pump Gear Oil Pressure Gauge Stuck at 0 Psig, February 12, 2013

Section 1R15

- IR 1413971; Byron OAD Investigated and Identified an Abnormal Indication of the Over Current Relay, October 11, 2012
- NSWP-S-05; Concrete Expansion Anchors, Revision 7
- Calculation 7.16.10.2-BYR97-229; Structural Evaluation of Battery Racks and the Mounting Details in 111 and 112 Battery Rooms of the Auxiliary Building, Revision 4
- Drawing 6E-0-3391AY; 125V DC Battery Rack Mounting Details
- Drawing M-11978; Bus 111 & 211 125V DC "L" Two Step EP3 Racks, Revision 2

- Drawing 6E-0-3391AH; Byron Station Unit 1& 2, Electrical Equipment Mounting Details, Revision S
- Drawing 64-05906; Floor Rack – Two Step EQ Protected for Plate Size 3 and 4 Batteries, Revision 0
- CC-AA-112; Temporary Configuration Changes, Revision 19
- EC 378402; Single Use Evaluation for ½ of SX Cubical Coolers Not Available, January 6, 2010
- EC 392429; Operation of SX Pump with Single Cubical Cooler, February 12, 2013
- IR 1465872; Review of Braidwood IR 1459353 – PZR PORV Accumulator Pressure, January 22
- CN-RRR-00-47; Calculational Table for Byron and Braidwood Natural Circulation Cooldown, Revision 1

Section 1R18

- Performance Verification Testing; RCFC Check Dampers for Byron Units 1 and 2, July 1981
- Sargent & Lundy Fan Check Dampers for Byron Units 1 and 2, March 5, 1985
- Material and Equipment Receiving and Inspection Report CECo Engineering and Construction, June 30, 1981
- Material and Equipment Receiving and Inspection Report CECo Engineering and Construction, June 30, 1981
- Q.F.2910.24; Project No. 4391-05, Tornado/Isolation Dampers, May 11, 1981
- Q.F.2910.24; Project No. 4392-05, Tornado/Isolation Dampers, May 11, 1981
- IR 1419184; RCFC Damper Missing Springs; September 27, 2012
- IR 1419189; RCFC Damper Missing Springs; September 27, 2012
- IR 1419190; RCFC Damper Missing Springs; September 27, 2012
- IR 1419192; RCFC Damper Missing Springs; September 27, 2012
- IR 1474498; NRC Follow-Up – RCFC Discharge Check Damper; February 7, 2013

Section 1R19

- IR 1473967; No SX PP Cubicle Cooler Tubesheet Degradation Margin Exists, February 11, 2013
- WO 1493809; 214 Instrument Inverter EOC Walkdown Due to 211 INV Failure, Revision 1
- WO 1591475; 1SX01PA Comprehensive IST Required for Essential Service Water Pump, February 14, 2013
- BOP IP-1; Instrument Bus Inverter Startup, Revision 14
- IR 1472776; ACB 1442 Drives On-Line Risk Yellow for Both Units, February 8, 2013
- IR 1473015; Lockout Relay 486-1442 for Breaker 1442 is Degraded, February 8, 2013
- WO 1237471; Bus 144 Sat 142-2 Feed (ACB 1442) RES OC Relay Routine, February 8, 2013
- WO 1444425; Replace Lockout Relay on ACB 1442, February 9, 2013
- WO 1591475; 1SX01PA Comprehensive IST Requirement for Essential Service Water Pump, February 14, 2013
- WO 1418630; Support Eddy Current Testing for 1A SX Pump Cubical Cooler, February 14, 2013
- WO 1366902; Operation Run Cooler and Check for Proper Operation, February 14, 2013
- WO 1314236; Preventative Maintenance on Breaker SAT Feed, February 14, 2013

Section 1R20

- OP-AA-101-113-1004; Equipment Prompt: 2A Generator Stator Cooling Water Pump (2A GC) Tripped, Revision 24

- IR 1490321; Smoke Noticed Coming from the 2A FW Pump Motor, March 20, 2013
- IR 1490323; DRPI POD M-12 Indicated General Warning Following Reactor Trip, March 20, 2013
- IR 1493026; Smoke was Reported Coming from U2 Voltage Regulator Cabinet, March 20, 2013
- IR 1490315; U-2 Reactor Trip – Loss of GC, March 20, 2013
- IR 1490330; Oil Leaking From Exciter End of Main Generator, March 20, 2013
- IR 1490407; Need Cleanup of Generator Oil Leak in Various TB Elevations, March 21, 2013
- IR 1490453; U2 RCDT Elevated Inputs Investigation, March 21, 2013
- IR 1490635; Following U2 Reactor Trip, 2AR11J went Dark Blue and then White, March 21, 2013

Section 1R22

- 1BOSR 3.1.5-1; Train A Solid State Protection System Surveillance, Revision 32
- WO 1469526 01; ESF Relay Train Reactor Trip – K636/2FW039S, February 25, 2013
- IR 631199; Revise Unit Two Schematic Diagram 6E-2 4030FW56, May 18, 2007
- IR 848809; 12/15 E-3 Schedule Review, November 23, 2008
- IR 1064332; Inadequate Technical Information Provided for New SSPS Cards, May 2, 2010
- IR 1293130; UV Driver Card Vulnerability in OE 34462 Applicable at Byron, November 21, 2011
- IR 1323037; Unexpected FWI While Closing RX Trip Breakers, February 5, 2012
- IR 1328319; Unexpected Ground Reading During SSPS Surveillance, February 17, 2012
- IR 1329012; Unexpected FWI While Closing RX Trip Breakers, February 20, 2012
- IR 1329908; Low Contact Volts Found During SSPS – Not Unusual, February 21, 2012
- IR 1374658; Low Voltage Reading During 2BOSR 3.1.5-2, June 5, 2012
- WO 1588151; 1CS01PB Comprehensive IST Requirements for Containment Spray Pump, January 29, 2013
- BOP CS-5; Containment Spray System Recirculation to the RWST, Revision 11
- WO 1609614; 1A Diesel Generator Operability Surveillance, February 6, 2013
- 1BOSR 8.1.2-1; Unit 1 Train A Diesel Generator Operability Surveillance, Revision 20
- WO 1596040; ESF Relay Train B CS-K644 ESFAS Instrumentation ESF Relay Surveillance, February 28, 2013
- WO 1597146; 2CS01PB Comprehensive IST Requirements for Containment Spray Pump, February 28, 2013

Section 2RS4

- Final Response to Task Interface Agreement 2012-05; ML12268A330; October 16, 2012

Section 4OA1

- Power History Curves for Unit 1 and Unit 2, January 2012 through December 2012
- Performance Indicator Data as Reported for the Period January 2012 through December 2012
- IR 1319908; B2F26 U2 Reactor Trip Due To Electrical Fault and Unusual Event, January 30, 2012
- IR 1323547; B2F27 Manual Reactor Trip and Manual Auxiliary Feedwater Actuation, February 6, 2012

Section 4OA2

- IR 1474066; Issues With SX to CC MOD Installation, February 11, 2013
- IR 1477430; Insufficient Insertion of Anti-Vibration Bars in Alloy 600, February 19, 2013
- IR 1413971; EACE – 1B RH Pump Trip Due to CO-5 Overcurrent Relay Operation, September 17, 2012
- IR1272187; Issues Applicable to Byron from Bwd Mod/50.59 Inspection; October 4, 2011
- IR 1296141; NER NC-11-045-Y Fleet Wide Actions; September 28, 2011
- Byron Document No. DS-MC-01-BY; Certification of Design Specification for Primary Containment Piping Penetration Assemblies; Revision 3
- Byron/Braidwood Document No. 01-10-52; Bryon/Braidwood Piping Design Specification; Revision 2
- Calculation No. 13.2.29BY; Mechanical Component Support 1SI06025V; Revision 2X
- ER-AA-380; Primary Containment Leakrate Testing Program, Revision 9
- BVP 800-39; Primary Containment Leakrate Testing Program, Revision 10
- 1BOSR 6.1.1-19; Unit 1 Primary Containment Type C Leakage Rate Tests and IST Tests of the OffGas System, Revision 8
- 2BVSR 6.1.1-24; Unit 2 Summation of Primary Containment Type B & C Local Leakage Tests for Acceptance Criteria, Revision 12
- 1BVSR 6.1.1-24; Unit 2 Summation of Primary Containment Type B & C Local Leakage Tests for Acceptance Criteria, Revision 15
- IR 1298667; Long Term LCO for VQ Valves Needs Resolution, December 6, 2011
- IR 1306607; Long Term LCO Extent of Condition Review Per IR 1298667, December 26, 2011
- EC 390536; Determine Acceptability of Code Case N-597-2 use on FAC Components 1FW085B/D, Revision 0
- IR 1412470; B1R18 FAC Component 1FW085B Exam Failure, September 13, 2012
- IR 1415327; B1R18 FAC Component 1FW085D Exam Failure, September 13, 2012

Corrective Action Documents As a Result of NRC Inspection

- IR 1487707; NRC ID UFSAR Discrepancy-Appendix A, Page A.1.57-1; March 14, 2013
- IR 1478188; NRC Identified Use of CMTR in a 80's Calculation; February 21, 2013
- IR 1490153; NRC/IEMA 1A DG HELB Modification Walkdown; March 20, 2013
- IR 1493278; NRC ID'ed: PDP 50.59 Enhancement Required, March 27, 2013

Section 4OA5

- IR 1466355; FUK: Update UFSAR Regarding External Flooding, January 24, 2013
- IR 1472808; FUK: Effect of Local Intense Precipitation on FHB and SFP PP, February 8, 2013
- IR 1474686; FUK: Concrete Steps on 401" FHB to Areas 5 & 7, February 13, 2013
- IR 1475877; Blockwall Penetrations in SFP Pump Room, February 15, 2013
- IR 1484749; FUK: MCC 133X1 Fasteners Seismic Walkdown, March 7, 2013
- IR 1484755; FUK: MCC 133X1 Fasteners Seismic Walkdown, March 7, 2013
- IR 1484758; FUK: MCC 133X1 Fasteners Seismic Walkdown, March 7, 2013
- IR 1484765; FUK: MCC 132X3 Fasteners Seismic Walkdown, March 7, 2013
- IR 1484768; FUK: MCC 131X3 Fasteners Seismic Walkdown, March 7, 2013

Corrective Action Documents As a Result of NRC Inspection

- IR 1453636; FUK: Flooding and Seismic Walkdowns, December 18, 2012

LIST OF ACRONYMS USE

ADAMS	Agencywide Document Access and Management System
AISC	American Institute of Steel Construction
ASME	American Society of Mechanical Engineers
CAP	Corrective Action Program
CFR	Code of Federal Regulations
CLB	Current Licensing Basis
ECCS	Emergency Core Cooling System
ESF	Engineered Safety Feature
FHB	Fuel Handling Building
FIN	Finding
FSAR	Final Safety Analysis Report
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Inspection Report
IR	Issue Report
LCO	Limiting Condition for Operation
NCV	Non-Cited Violation
NEI	Nuclear Energy Institute
NRC	U.S. Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
NVLAP	National Voluntary Laboratory Accreditation Program
PARS	Publicly Available Records System
PI	Performance Indicator
PMP	Probable Maximum Precipitation
PORV	Power-Operated Relief Valve
RCFC	Reactor Containment Fan Cooler
ROP	Reactor Oversight Process
RFO	Refueling Outage
SDP	Significance Determination Process
SI	Safety Injection
SSC	Structure, System, or Component
SWEL	Seismic Walkdown Equipment List
SX	Essential Service Water
TI	Temporary Instruction
TIA	Task Interface Agreement
TLD	Thermoluminescent Dosimeter
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
VDC	Volt Direct Current
WO	Work Order

M. Pacilo

-2-

Should you have any questions concerning this erratum, we will be pleased to discuss them with you.

Sincerely,

/RA/

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

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

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Letter to M. Pacilio from E. Duncan dated May 10, 2013

SUBJECT: ERRATUM FOR BYRON STATION, UNITS 1 AND 2, NRC INTEGRATED
INSPECTION REPORT 05000454/2013002; 05000455/2013002

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