



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION III
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August 7, 2017

Mr. Bryan C. Hanson
Senior VP, Exelon Generation Company, LLC
President and CNO, Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

**SUBJECT: BYRON STATION, UNITS 1 AND 2—NRC INTEGRATED INSPECTION REPORT
05000454/2017002 AND 05000455/2017002**

Dear Mr. Hanson:

On June 30, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an integrated inspection at your Byron Station, Units 1 and 2. On July 11, 2017, the NRC inspectors discussed the results of this inspection with Mr. H. Welt and other members of your staff. The results of this inspection are documented in the enclosed report.

Based on the results of this inspection, the NRC has identified one finding that was evaluated under the risk significance determination process as having very low safety significance (Green). Issue reports were entered into the corrective action program to address this issue.

If you disagree with the cross-cutting aspect assignment or any finding not associated with a regulatory requirement 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 U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, Region III; and the NRC Resident Inspector at the Byron Station.

This letter, its enclosure, and your response (if any) will be made available for public inspections and copying at <http://www.nrc.gov/reading-rm/adams.html> and at the NRC Public Document Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

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:
IR 05000454/2017002; 05000455/2017002

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Letter to Bryan C. Hanson from Eric Duncan dated August 7, 2017

SUBJECT: BYRON STATION, UNITS 1 AND 2—NRC INTEGRATED INSPECTION REPORT
05000454/2017002 AND 05000455/2017002

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos: 05000454; 05000455
License Nos: NPF-37; NPF-66

Report No: 05000454/2017002; 05000455/2017002

Licensee: Exelon Generation Company, LLC

Facility: Byron Station, Units 1 and 2

Location: Byron, IL

Dates: April 1 through June 30, 2017

Inspectors: J. McGhee, Senior Resident Inspector
J. Draper, Resident Inspector
C. Hunt, Resident Inspector
K. Pusateri, Reactor Engineer
C. Thompson, Resident Inspector,
Illinois Emergency Management Agency

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

Enclosure

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SUMMARY

Inspection Report 05000454/2017002, 05000455/2017002; 04/01/2017 – 06/30/2017; Byron Station, Units 1 and 2; Identification and Resolution of Problems.

This report covers a 3-month period of inspection by resident inspectors and announced baseline inspections by regional inspectors. One Green finding was identified by the inspectors. The finding was not associated with U.S. Nuclear Regulatory Commission (NRC) regulations. The significance of inspection findings is indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process," dated April 29, 2015. Cross-cutting aspects are determined using IMC 0310, "Aspects Within the Cross-Cutting Areas," dated December 4, 2014. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy, dated November 1, 2016. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 6.

Green. A finding of very low safety significance was self-revealed on March 28, 2017, when operators rapidly reduced generator load in response to a loss of forced cooling for the newly installed Unit 1 East main power transformer (1E MPT) and an indicated rapid rise in transformer winding hotspot temperature caused by vendor data entry errors in the monitoring system software. The process detailed in CC-AA-256-101, "Software Quality Assurance Process for Plant Digital Instrumentation and Control Systems and Components," to verify and validate the software/firmware during updates was not implemented after the vendor made changes to the digital software during the modification process. The issue was entered into the licensee's corrective action program (CAP) and corrective actions included replacement of the cooling group supply breaker, correction of the software errors, and revision of the alarm response procedure and supporting documentation.

The inspectors concluded that the issue was more than minor because it adversely impacted the Design Control attribute of the Initiating Events Cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during plant operations. Specifically, rapid power changes or load reject could challenge operating safety limits. In this event, the rapid rise in the calculated winding hotspot indications and subsequent operator actions to rapidly reduce load over 300 megawatts electric (MWe) was the result of two software errors: (1) an incorrect Current-Turns (CT) Ratio and (2) the incorrect configuration of the MPT cooling groups in series within the software. The inspectors utilized Exhibit 1, "Initiating Events Screening Questions" of IMC 0609, "Significance Determination Process," Appendix A, dated June 19, 2012, to conclude that the finding was Green, or of very low safety significance, because the event did not cause a reactor trip and the event did not affect any mitigation equipment. A cross-cutting aspect in the Challenge the Unknown element of the Human Performance Area (IMC 0310 H.11) was assigned because the engineering group based the risk evaluation on the vendor input that the scope of the change was limited. The flawed assumption that the vendor input was correct without verification resulted in a failure to manage the risk prior to implementation through the verification/validation of the software/firmware. [Section 4OA2.4]

REPORT DETAILS

Summary of Plant Status

During this inspection period, both Byron Station Units 1 and 2 were periodically scheduled to vary electrical output by the grid operator for short periods to help ease congestion on the transmission system or to support the economic dispatch agreement between Exelon and the grid operator.

Units 1 and 2 began the period at full power and operated at scheduled power levels for the entire inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01)

.1 Summer Seasonal Readiness Preparations

a. Inspection Scope

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

During the inspection, the inspectors focused on plant-specific design features and the licensee's procedures used to mitigate or respond to adverse weather conditions. Additionally, the inspectors reviewed the Updated Final Safety Analysis Report (UFSAR) and performance requirements for systems selected for inspection, and verified that operator actions were appropriate as specified by plant-specific procedures. The inspectors also 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. The inspectors' reviews focused specifically on the following plant systems:

- Switchyard; and
- Unit 1 and Unit 2 Main Power Transformers.

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

b. Findings

No findings were identified.

.2 External Flooding

a. Inspection Scope

The inspectors evaluated the design, material condition, and procedures for coping with the design basis probable maximum flood. The evaluation included a review to check for deviations from the descriptions provided in the UFSAR for features intended to mitigate the potential for flooding from external factors. Additionally, the inspectors

performed a walkdown of the essential service water make up pumps to review the condition of barriers and identify any modification to the river screen house which would inhibit drainage during a flooding event or allow water ingress past a barrier.

This inspection constituted one external flooding 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 B (1B) essential service water (SX) while Unit 1 Train A (1A) SX was out-of-service for planned maintenance;
- Unit 2 Train A (2A) residual heat removal (RH) while Unit 2 Train B (2B) RH was out-of-service for planned maintenance;
- 2B auxiliary feedwater (AF) while 2A AF was out-of-service for planned maintenance; and
- 2A Containment Spray (CS) while 2B CS 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, UFSAR sections, Technical Specification (TS) requirements, outstanding work orders (WOs), issue reports (IRs), and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have rendered the systems incapable of performing their intended functions. The inspectors also walked down accessible portions of the systems to verify system components and support equipment were aligned correctly and 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.

These activities constituted four 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 condition of firefighting equipment in the following risk-significant plant areas:

- Unit 1 Auxiliary Bldg. 439'-0" Elev. Lower Cable Spreading Room;
- Unit 2 Auxiliary Bldg. 439'-0" Elev. Lower Cable Spreading Room; and
- Unit 2 Auxiliary Bldg. 383'-0" Elev. 2B Auxiliary Diesel Feedwater Pump and Day Tank Room.

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. The inspectors verified that fire hoses and extinguishers were in their designated locations and available for immediate use; that fire detectors and sprinklers were unobstructed; that transient material loading was within analyzed limits; and fire doors, dampers, and penetration seals appeared to be in satisfactory condition. The inspectors also verified that minor issues identified during the inspection were entered into the licensee's CAP.

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

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program (71111.11)

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

a. Inspection Scope

On May 23, 2017, the inspectors observed a crew of licensed operators in the plant's simulator during licensed operator requalification training. The inspectors verified that operator performance was adequate, evaluators were identifying and documenting crew performance problems, and that 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.

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

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12)

.1 Routine Quarterly Evaluations

a. Inspection Scope

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

- Unit 1 RH;
- Unit 1 Condensate Booster System (CB); and
- Unit 2 Instrument Power.

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

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

The inspector performed a quality review for the Unit 2 Instrument Power system, as discussed in IP 71111.12, Section 02.02.

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.

This inspection constituted two quarterly maintenance effectiveness samples and one quality control maintenance effectiveness sample 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:

- Emergent yellow risk on unit 1 following failure of 1RH619 flow control valve;
- 1A SX work window and 1A AF surveillances during the week of April 10, 2017;
- 2A AF pump K632 relay surveillance; and
- Unplanned trip and restoration of motor control center (MCC) 133Z2 feeder breaker.

These activities were selected based on their potential risk significance relative to the Reactor Safety Cornerstones. As applicable for each activity, the inspectors verified that risk assessments were performed as required by 10 CFR 50.65(a)(4) and were accurate and complete. When emergent work was performed, the inspectors verified that the plant risk was promptly reassessed and managed. The inspectors reviewed the scope of maintenance work, discussed the results of the assessment with the licensee's probabilistic risk analyst or shift technical advisor, and verified plant conditions were consistent with the risk assessment. The inspectors also reviewed TS requirements and walked down portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met.

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

b. Findings

No findings were identified.

1R15 Operability Determinations and Functional Assessments (71111.15)

.1 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the following issues:

- Unexpected alarm for reactor coolant pump electrical bus undervoltage;
- Unit 1 containment emergency core cooling systems (ECCS) gas void ultrasonic testing exam results for 1SI092;
- Part 21 evaluation for AMETEK potential circuit board defect;
- Unit 1 control rod drive (RD) system pulse-to-analogue (P/A) converter & bank overlap unit not reading correctly; and
- Found two broken studs and degraded rubber on 2DSFSO03 flood seal.

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

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

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19)

.1 Post-Maintenance Testing

a. Inspection Scope

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

- 1A SX system PMT following strainer inspection and weld of 3/4" instrument line;
- 1B emergency diesel generator (EDG) overspeed trip surveillance following overhaul work window;
- Repair of 125 VDC battery charger 112 after circuit card failure; and
- 2A AF pump after maintenance window.

These activities were selected based upon the structure, system, or component's ability to impact risk. The inspectors evaluated these activities for the following (as applicable): the effect of testing on the plant had been adequately addressed; testing was adequate for the maintenance performed; acceptance criteria were clear and demonstrated operational readiness; test instrumentation was appropriate; tests were performed as written in accordance with properly reviewed and approved procedures; equipment was returned to its operational status following testing (temporary modifications or jumpers required for test performance were properly removed after test completion); and test documentation was properly evaluated. The inspectors evaluated the activities against 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 in the CAP and that the problems were being corrected commensurate with their importance to safety.

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

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:

- 2BOSR 8.1.14-2 Revision 23; 2B Diesel Generator 24-Hour Endurance Run and Hot Restart (routine);
- 0BOSR 5.5.8.SX.5-1c, Revision 12; Unit Zero Comprehensive Inservice Testing (IST) Requirements For Essential Service Water Makeup Pump 0A;
- 2BOSR 7.5.4-2; 2B Diesel Driven Auxiliary Feed Pump Monthly Surveillance (routine); and
- 2BOSR 5.5.8.CS 5-1c Revision 4; Unit Two Comprehensive Inservice Testing (IST) Requirements for Containment Spray Pump 2CS01PA.

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, sufficient to 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 TS, 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 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 (PI) data;
- were test results not meeting acceptance criteria addressed with an adequate operability evaluation or was the system or component declared inoperable;
- 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 functions following testing;
- were problems identified during the testing appropriately documented and dispositioned in the licensee's CAP;
- were annunciators and other alarms demonstrated to be functional and were setpoints consistent with design requirements; and
- were alarm response procedure entry points and actions consistent with the plant design and licensing documents.

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

b. Findings

No findings were identified.

1EP6 Drill Evaluation (71114.06)

.1 Emergency Preparedness Drill Observation

a. Inspection Scope

The inspectors evaluated the conduct of a routine licensee emergency drill on June 21, 2017, to identify any weaknesses and deficiencies in classification, notification, and protective action recommendation development activities. As part of the inspection, the inspectors reviewed the drill package and expected scenario timeline. The inspectors observed emergency response operations in the Main Control Room (MCR) and the Technical Support Center (TSC) to determine whether the event classification, notifications, and protective action recommendations were performed in accordance with

procedures. The inspectors also attended the licensee drill critique to compare any inspector-observed weakness with those identified by the licensee staff in order to evaluate the critique and to verify whether the licensee staff was properly identifying weaknesses and entering them into the CAP. The inspector also verified that identified performance deficiencies were entered into the CAP.

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

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

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

40A1 Performance Indicator Verification (71151)

.1 Safety System Functional Failures

a. Inspection Scope

The inspectors sampled licensee submittals for the Safety System Functional Failures PI for Byron Station Units 1 and 2 for the period from the second quarter 2016 through the first quarter 2017. To determine the accuracy of the PI data reported during those periods, guidance contained in the Nuclear Energy Institute (NEI) Document 99–02, “Regulatory Assessment Performance Indicator Guideline,” Revision 7, dated August 31, 2013, and NUREG–1022, “Event Reporting Guidelines 10 CFR 50.72 and 50.73” definitions and guidance, were used. The inspectors reviewed the licensee’s operator narrative logs, operability assessments, maintenance rule records, maintenance work orders, inspection reports, event reports and NRC Integrated Inspection Reports for the period April 1, 2016 through March 31, 2017 to validate the accuracy of the submittals. The inspectors also reviewed the licensee’s issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator.

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

b. Findings

No findings were identified.

.2 Reactor Coolant System Leakage

a. Inspection Scope

The inspectors sampled licensee submittals for the reactor coolant system (RCS) leakage PI for Byron Station Units 1 and 2 for the period from the second quarter 2016 through the first quarter 2017. To determine the accuracy of the PI data reported during

those periods, guidance contained in the NEI Document 99–02, “Regulatory Assessment Performance Indicator Guideline,” Revision 7, dated August 31, 2013, was used. The inspectors reviewed the licensee’s operator logs, RCS leakage tracking data, inspection reports, event reports and NRC Integrated Inspection Reports for the period of April 1, 2016 through March 31, 2017 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.

This inspection constituted two reactor coolant system leakage 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 discussed in previous sections of this report, the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify they were being entered into the licensee’s CAP at an appropriate threshold, adequate attention was being given to timely corrective actions, and adverse trends were identified and addressed. Some minor issues were entered into the licensee’s CAP as a result of the inspectors’ observations; however, they are not discussed in this report.

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.

b. Findings

No findings were identified.

.2 Semi-Annual Trend Review

a. Inspection Scope

The inspectors performed a review of the licensee’s CAP and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors’ review was focused on repetitive equipment issues, but also considered the results of daily inspector CAP item screening discussed in Section 4OA2.1 above, licensee trending efforts, and licensee human performance results. The inspectors’ review nominally considered the 6-month period of December 2016 through May 2017, although some examples expanded beyond those dates where the scope of the potential trend warranted.

The review also included issues documented outside the CAP in major equipment problem lists, repetitive and/or rework maintenance lists, departmental problem/challenges lists, system health reports, quality assurance audit/surveillance reports, self-assessment reports, and Maintenance Rule assessments. The inspectors

compared and contrasted their results with the results contained in the licensee's CAP trending reports. 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 review inspection sample as defined in IP 71152.

b. Findings

No findings were identified.

.3 Annual Follow-up of Selected Issues: Site Evaluation of Vulnerability for Emergency Diesel Generator Fuel Injector Pump Delivery Valve Holder Cracking Reported to the NRC under Part 21

a. Inspection Scope

The inspectors selected the following IRs for in-depth review:

- IR 03955974; D.C. Cook Cracks in EDG Fuel Injector Pump delivery valve holder (DVH).

As appropriate, the inspectors verified the following attributes during their review of the licensee's corrective actions for the above IRs and other related IRs:

- complete and accurate identification of the problem in a timely manner commensurate with its safety significance and ease of discovery;
- evaluation and disposition of operability/functionality/reportability issues;
- evaluation of identified root and contributing causes of the problem; and
- completion of assigned actions in a timely manner commensurate with the safety significance of the issue.

The station engineer communicated with the Part 21 originator to ascertain the specific details of the failure. Although Byron station EDGs used the same model DVH as the D.C. Cook machines, the operating pressure of the injector was significantly lower at Byron station. In addition, the Byron application of the DVH did not have the machined modification reported to contribute to the fatigue cracking at D.C. Cook. The engineer conducted field inspections of each diesel during machine operation as part of his evaluation. As a result, the final evaluation concluded that the Byron DVHs were not susceptible to the same failure. The NRC inspectors performed independent walk downs on all EDGs while the machines were operating to verify the condition described in the Part 21 were not present at the station.

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

b. Findings

No findings were identified.

.4 Annual Follow-up of Selected Issues: Unit 1 East (1E) Main Power Transformer Group 1 Cooling Fans Supply Breaker Trip

a. Inspection Scope

The inspectors selected the following IRs for in-depth review:

- IR 03990691; 1E main power transformer (MPT) Group 1 Cooling Fans Supply Breaker Trip; and
- IR 03991415; 1E MPT Cooling Group 1 Troubleshooting Results.

The operator response to this event and the plant response to the event and subsequent transient were previously discussed in NRC Inspection Report 05000454(455)/2017001.

The inspectors verified the following attributes during their review of the licensee's corrective actions for the above IRs and other related IRs:

- complete and accurate identification of the problem in a timely manner commensurate with its safety significance and ease of discovery;
- consideration of the extent of condition, generic implications, common cause, and previous occurrences;
- evaluation and disposition of operability/functionality/reportability issues;
- classification and prioritization of the resolution of the problem commensurate with safety significance;
- identification of the root and contributing causes of the problem;
- identification of corrective actions, which were appropriately focused to correct the problem;
- completion of corrective actions in a timely manner commensurate with the safety significance of the issue; and
- applicability for operating experience and communicate applicable lessons learned to appropriate organizations.

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

b. Findings

Introduction: A self-revealed Green finding was identified on March 28, 2017, when operators rapidly reduced generator load in response to a loss of forced cooling to the newly installed 1E MPT and indicated rapid rise in transformer winding hotspot temperature caused by vendor data entry errors in the monitoring system software. The process detailed in CC-AA-256-101, "Software Quality Assurance Process for Plant Digital Instrumentation and Control Systems and Components," to verify and validate the software was not performed after the vendor made changes to the digital software during the modification process.

Description: During the Unit 1 refueling outage in the spring of 2017, Byron Station installed two new main power transformers as a plant modification. The transformers were energized on March 26, 2017, with Cooling Group 1 selected as the lead cooling bank and Group 2 as the backup bank. Power ascension was in progress with the unit

at 1162 MWe when the initial transformer trouble alarm was received at 1744 on March 28, 2017.

The breaker supplying Cooling Group 1 (6 fans and 3 oil pumps) tripped open. When the backup cooling group did not immediately start as the operators expected, the control room operators dispatched an equipment operator to investigate locally at the transformer and followed the actions listed in the alarm response procedure, BAR 1-19-B10, "Main Transformer 1E Trouble." The BAR (alarm response procedure) indicated that the standby cooling fans and oil pumps should have started when the top oil temperature exceeded 65 degrees centigrade (°C) or winding temperature exceeded 75°C. The procedure also directed the operators to refer to 1BGP 100-3A12, "Hyundai Transformer Operation Tables," for monitoring requirements and limits if transformer cooling was lost or damaged. The BAR subsequently directed operators to monitor oil and winding temperatures. Indication for key parameters (load, winding temperature, oil temperature and operating status) was available to the control room operators from the plant process computer.

1BGP 100-3A12 stated that the maximum temperature allowed by the vendor was 110°C and directed load reduction or removal of the transformer from service to prevent exceeding a MPT winding temperature of 130°C. The procedure also stated, "A complete loss of cooling may result in temperature limits being reached in approximately 3 minutes." The BGP 100-3A12 Table listed six temperature points required to be maintained below 130°C; three HV (high voltage) winding data points and three LV (low voltage) winding data points. When the control room operators referred to the computer display for the transformer they saw two data points labeled "Hotspot Temperature HV (high voltage) Winding" and "Hotspot Temperature LV (low voltage) Winding." Both of the data points were rising rapidly. On a separate screen, the operators located the six winding temperature points identified in the BGP and noted that they were apparently not changing. The operators concluded that although the rising "hotspot" temperature indications were not one of the procedurally identified points on the Temperature Monitoring Table of 1BGP 100-3A12, the computer points indicated temperature at some locations in the transformer were rising rapidly. Due to the high rate of temperature increase of the two indications, the operating crew took action based on the indication to rapidly reduce transformer loading to prevent potential damage to the transformer. At the calculated temperature reaching 75°C, the backup cooling group started, but the monitoring software did not recognize that cooling had been restored. Shortly thereafter, the tripped supply breaker was reset. Group 1 transformer cooling restarted and the temperature then started to rapidly lower. The runback was terminated at 730 MWe.

Subsequent troubleshooting of the cooling group supply breaker identified that the compression fittings connecting the load side wiring to the breaker had loosened creating a high resistance connection and some arcing was evident on the "B" phase when the breaker was disassembled. The breaker was replaced and thermography used to evaluate potential extent of condition did not identify any similar vulnerabilities on other connection sites on either of the two new transformers.

Further analysis determined that the two hotspot indications were indicating falsely high temperatures. The licensee discovered that these two parameters were "predicted" winding temperatures calculated by the transformer monitoring computer based on load, top oil temperature and cooling capability. The transformer monitoring system perceived

the breaker trip to be a complete loss of cooling capability because the two cooling supplies were modeled in the software so that if either cooling bank supply breaker was open, a complete loss of cooling was indicated. In addition, the parameters were reading falsely high because the vendor had changed the Current–Turns (CT) Ratio in the calculation, did not inform the licensee’s design team of the change and the error was not identified by the licensee’s modification review team. The result of these two errors was that the monitoring software/firmware calculated value rose rapidly indicating a severe overheating condition while actual temperature changed only about 2°C.

Analysis: The inspectors determined that the failure to verify software changes during the modification and testing process was a performance deficiency that warranted review in the SDP. Specifically, the responsible engineer determined no additional testing or review was required due to the limited scope of the changes and did not implement the process outlined in CC-AA-256-101, “Software Quality Assurance Process for Plant Digital Instrumentation and Control Systems and Components,” to verify and validate the vendor software changes.

The inspectors concluded that the issue was more than minor because it was associated with the Design Control attribute of the Initiating Events Cornerstone and adversely impacted the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during plant operations. Specifically, rapid power changes or load reject could challenge operating safety limits. In this event, the rapid rise in the calculated winding hotspot indications and subsequent operator actions to rapidly reduce load over 300 MWe was primarily the result of the wrong CT Ratio included in the software for the transformer monitoring system implemented with the modification and the incorrect configuration of the MPT cooling system within the software.

The inspectors utilized Exhibit 1, “Initiating Events Screening Questions” of IMC 0609, “Significance Determination Process,” Appendix A, dated June 19, 2012, to evaluate the significance of the issue. The inspectors answered the Section B question as “No” because the event did not cause a reactor trip. The inspectors also answered the Section C question as “No” because the event did not affect any mitigation equipment. As a result, the finding screened as Green, or of very low safety significance.

A cross-cutting aspect in the Challenge the Unknown element of the Human Performance Area (IMC 0310 H.11) was assigned because the engineering group based the risk evaluation on the vendor input that the scope of the change was limited. The flawed assumption that the vendor information was correct without verification resulted in a failure to manage the risk prior to implementation through the verification/validation of the software/firmware and was a direct contributor to the power reduction. (IMC 0310 H.11)

Enforcement: The inspectors did not identify a violation of regulatory requirements associated with this finding. The licensee initiated Inspection Reports 03990691 and 03991415 to document the event, troubleshooting, and corrective actions. **(FIN 05000454/2017002-01; Failure to Verify Computer Software during a Transformer Replacement Modification)**. Corrective actions included replacement of the cooling group supply breaker, verification that no other electrical connections had degraded on either of the two transformers, correction of the software errors, and revision of the alarm response procedure and supporting documentation including the operator interface.

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

- .1 (Closed) Licensee Event Report 05000454/2017-001-00: Byron Station Unit 1 Volumetric and Surface Examinations of Reactor Pressure Vessel Head Penetration Nozzles Identify Indications Attributed to Primary Water Stress Corrosion Cracking and Minor Subsurface Void Enlargement from Operating Stresses.

During the spring 2017 refueling outage, volumetric and surface examinations of the Reactor Pressure Vessel (RPV) head penetration nozzles identified recordable indications on nozzles 31, 74, 76, and 77 that did not meet acceptance criteria. Penetration 31 had been previously repaired and discovery of the indication was reported to the NRC in Event Report 52591 on March 3, 2017. On March 5, the station reported additional indications in Event Report 52592 and updated that report on March 6, 2017, to include the additional indications.

The inspectors reviewed the repair of these indications and associated documentation during the refueling outage and the results of that inspection were documented in Section 1R08 of NRC Inspection Report 05000454(455)/2017001. The inspectors subsequently reviewed the causal evaluations performed by the licensee. The issues were initially documented in the licensee's CAP in IRs 03981261, 03981686, and 03982084. The causal evaluation for all three IRs is documented in IR 03981686.

The cause of the penetration 31 indications was determined to be existing welding discontinuities/minor subsurface voids opening to the surface or enlarging due to thermal and/or pressure stresses during operation. The other indications were determined to be caused by Primary Water Stress Corrosion Cracking (PWSCC). In all cases, the indications were removed by buffing or grinding. Byron Station implemented the Ultra High Pressure Cavitation Peening Process as a mitigating strategy to prevent further PWSCC degradation. This licensee event report (LER) is closed.

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

4OA6 Management Meetings

- .1 Exit Meeting Summary

On July 11, 2017, the inspectors presented the inspection results to Mr. H. Welt, 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.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

M. Kanavos, Site Vice President
T. Chalmers, Plant Manager
H. Welt, Operation Director
D. Spitzer, Regulatory Assurance Manger
S. Kerr, Manager - Projects
G. Contrady, NRC Coordinator
J. Armstrong, Organizational Effectiveness Manager
T. Faley, Maintenance Director
C. Cote, Shift Operations Superintendent
Z. Cox, Regulatory Assurance
S. Harvey, Chemistry Manager
P. Boyle, Work Management Director
C. Keller, Engineering Director
K. McGuire, Senior Manager, Plant Engineering
B. Barton, Radiation Protection Manager

U.S. Nuclear Regulatory Commission

E. Duncan, Branch 3 Chief, Division of Reactor Projects
J. McGhee, Byron Senior Resident Inspector
C. Hunt, Byron Resident Inspector

Illinois Emergency Management Agency

C. Thompson, Resident Inspector, IEMA

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

05000454/2017-001-00	LER	Byron Station Unit 1 Volumetric and Surface Examinations of Reactor Pressure Vessel Head Penetration Nozzles Identify Indications Attributed to Primary Water Stress Corrosion Cracking and Minor Subsurface Void Enlargement from Operating Stresses
05000454/2017002-01	FIN	Failure to Verify Computer Software during a Transformer Replacement Modification

Closed

05000454/2017-001-00	LER	Byron Station Unit 1 Volumetric and Surface Examinations of Reactor Pressure Vessel Head Penetration Nozzles Identify Indications Attributed to Primary Water Stress Corrosion Cracking and Minor Subsurface Void Enlargement from Operating Stresses
05000454/2017002-01	FIN	Failure to Verify Computer Software during a Transformer Replacement Modification

LIST OF DOCUMENTS REVIEWED

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

1R01 Adverse Weather Protection

- WC-AA-107; Seasonal Readiness, Revision 17
- OBOA ENV-1; Adverse Weather Conditions Unit 0, Revision 123
- 1BOA ENV-1; Adverse Weather Conditions Unit 1, Revision 101
- 2BOA ENV-1; Adverse Weather Conditions Unit 2, Revision 101
- IR 04003881; Byron Summer Readiness Maintenance Review Results
- IR 02663147; Summer Readiness – Transformer Clearance Orders
- IR 04027404; Rock River Level Increase of 9.5”

1R04 Equipment Alignment

- M-42, Sheet 1A, Revision AR; Diagram of Essential Service Water
- M-42, Sheet 2A, Revision BC; Diagram of Essential Service Water
- M-42, Sheet 3, Revision BE; Diagram of Essential Service Water
- M-137; Diagram of Residual Heat Removal
- BOP RH-M2A, Revision 12; Residual Heat Removal System Valve Lineup
- WO 04616553; ECCS Venting and Valve Alignment Surveillance
- M-122; Diagram of Auxiliary Feedwater
- BOP AF-M2B, Revision 8; Auxiliary Feedwater System Valve Lineup
- BOP CS-M2A, Revision 2; Containment Spray Train “A” Valve Lineup
- BOP CS-E2A, Revision 1; Containment Spray Train “A” Electrical Lineup Lineup(Unit 2)
- M-129, Sheet 1A, Revision EDSF; Diagram of Containment Spray

1R05 Fire Protection

- IR 03997963; 1HS-CO044CP Indicating Light Burned Out
- IR 03997965; 1HS-CO056CP Indicating Light Burned Out
- IR 03997958; LCSR CO2 Panel 0CO05J: Broken Socket
- IR 03997959; LCSR CO2 Panel 0CO06J: Broken Socket
- Pre-Fire Plan FZ 3.2A-1 Revision 2; Auxiliary Bldg. 439'-0" Elev. Lower Cable Spreading Room
- Pre-Fire Plan FZ 3.2A-2 Revision 2; Auxiliary Bldg. 439'-0" Elev. Lower Cable Spreading Room
- Pre-Fire Plan FZ 11.4A-2 Revision 2; Auxiliary Bldg. 383'-0" Elev. 2B Auxiliary Diesel Feedwater Pump and Day Tank Room

1R11 Licensed Operator Regualification Program

- Evaluation Scenario for week of May, 23, 2017

1R12 Maintenance Effectiveness

- a(2) Determination for System RH-06 (Provide Decay Heat Removal During Shutdown)

- a(2) Determination for System RH-07 (Provide RCS Overpressure Protection During Low Pressure, Low Temperature Operations)
- a(2) Determination for System RH-10 (Provide for Letdown Flow During Low Pressure Plant Operation)
- a(2) Determination for System RH-12 (Provide High Flow, Low Pressure SI Flow, Net Positive Suction Head for CV and SI Pumps During Recirculation Phase, Minimum Flow Recirculation Path for RHR Pumps, Ability to Crosstie and Separate Trains as Required, Isolation from the Reactor Coolant and Other ECCS Systems During Power Operations, and Interlock Signals for Proper Operations of RH, SI, and CV Valves)
- a(2) Determination for System RH-13 (Remote Shutdown Instrumentation, as Defined by Technical Specifications and Required by 10CFR50, Appendix A, GDC 19)
- a(2) Determination for System RH-15 (Provide Inventory Control During Shutdown (RH Train) and Recirculation Flow for RH Pumps Back to RWST, Including Isolation of this Flowpath When Required)
- IR 03994096; 2FK-0619 Failed
- IR 03995584; Light out on 2LK-618
- Maintenance Rule System Basis Document for Functions CB-02, CB-03 and CB-06
- a(2) Determination for System CB
- IR 02642188; 1C CD/CB Pump Auto Start Caused Hydrazine Excursion
- IR 02643982; 1C CD/CB Abnormal Indications During Troubleshooting
- Maintenance Rule System Basis Document for Function IP-01
- IR 04011079; Unexpected Alarm, Bus 212 Inverter Trouble
- WO 01949302; FNE Remove/Install Sync/Oscillator Board in Bus 212

1R13 Maintenance Risk Assessments and Emergent Work Control

- IR 03994974; MCR Operator Challenges & NTD Card Fuse Amperage
- WO 04622421; Investigate Problem with 2FK-0619 as Identified in WR 01342739
- IR 03994096; 2FK-0619 Failed
- OP-BY-108-117-1000, Revision 9; Byron Protected Equipment Program
- WO 04598695; Slave Relay Train A Auxiliary Feedwater PP-K632, 639/AF
- IR 04006688; U1 CNMT ECCS Gas Void UT Exam Results – 1SI092
- IR 01534713; U2 CNMT ECCS Gas Void UT Exam Results – 1SI139
- IR 01536231; U2 CNMT ECCS Gas Void UT Exam Results – 2SI139
- IR 01536216; U2 CNMT ECCS Gas Void UT Exam Results – 2SI132
- EC 394562; Op Eval 13-006, Gas Voids in RH to CL Injection Path, Upstream of 2SI8818A and 2SI8818B
- IR 04018759; MCC 133Z2 Unexpectedly Lost Power
- IR 03966096; Vulnerability Identified on MCC 134V6
- IR 03988958; Bus 134X Feed Breaker (Cub 6B) to MCC 134X5/7 Tripped
- 6E-1-4008CW; Key Diagram 480V Turbine Building MCC 133Z2 (1AP59E)

1R15 Operability Evaluations

- IR 03996986; Unexpected Alarm RCP Bus Undervoltage
- IR 03998107; Received Unexpected Alarm Bus 257 Under Voltage
- IR 04011896; 10CFR21 Interim Notification – AMETEK Potential Circuit Board Defect
- IR 04012912; Found 2 Broken Studs on 2DSFSO03 Flood Seal
- WO 01857666; Flood Seal Opening Inspection
- WO 04641540; Found 2 Broken Studs on 2DSFSO03 Flood Seal
- Plant Barrier Impairment 17-088, dated 2/27/2017

- EC 399883; Impact of Potential Flood on SX Pump Room with Flood Seal Open
- IR 04023584; Unit 1 RD P/A Converter & Bank Overlap Unit not Reading Correct

1R19 Post Maintenance Testing

- WO 01431732; Replace Pipe 1SX688A-0.75 during Next Available Work Window
- WO 01785661; Open Strainer for Sediment Inspection, Repair as Necessary
- WO 01855558; (Change) Essential Service Water Pump 1A
- BOP SX-1 Revision 30; Essential Service Water Pump Startup
- M-42, Sheet 1B, Revision AT; Diagram of Essential Service Water
- M-2544A, Sheet 31, Revision A; Essential Service Water
- WO 01852476; 1B D/G Overspeed Trip Surveillance
- WO 01879213; 112 "B" Train 125V Battery Charger Operability Test
- 1BHSR 8.4.2-2, Revision 1; Unit 1 Bus 112 125VDC Battery Charger Operability
- IR 04003495; 125VDC Battery Charger Operability Test Failed
- WO 00912089; Troubleshoot and Repair 112 Battery Charger (Contingency)
- IR 04003670; Close Out Contingency Task for the 125 VDC Battery Charger 112
- WO 01967458; Calibrate Time Delay Relays AF1AX1 and AF1AX2 for 2AF01PA

1R22 Surveillance Testing

- 2BOSR 5.5.8.CS 5-1c Revision 4; Unit Two Comprehensive Inservice Testing (IST) Requirements for Containment Spray Pump 2CS01PA
- 2BOSR 8.1.14-2, Revision 23; 2B Diesel Generator 24 Hour Endurance Run and Hot Restart
- 2BOSR 7.5.4-2, Revision 25; 2B Diesel Driven Auxiliary Feed Pump Monthly Surveillance
- 0BOSR 5.5.8.SX.5-1c, Revision 12; Unit Zero Comprehensive Inservice Testing (IST) Requirements For Essential Service Water Makeup Pump 0A
- WO 04623381; LR-0A SX Makeup Pump Operability Surveillance
- 0BOSR 7.9.8-1, Revision 2; 0A Essential Service Water Makeup Pump 18 Month Surveillance
- IR 03978026; Follow Up To IR 3973619 and IR 3972739
- IR 03972739; 0A SX Makeup Pump IST Data Must be Retaken

1EP6 Drill Evaluation

- Pre-exercise Drill Timeline and Scenario Package
- Pre-exercise Critique Summary Memo from R. Lloyd dated 6/22/2017
- IR 04024687; Byron EP Pre-exercise Failed Facility Objective, TSC
- IR 04027115; Byron EP 2017 Pre-exercise – CR/Simulator DC [Demonstration Criteria] Failures
- IR 04027121; Byron EP 2017 Pre-exercise – TSC DC Failures
- IR 04027126; Byron EP 2017 Pre-exercise – OSC DC Failures
- IR 04027130; Byron EP 2017 Pre-exercise – Facilities and Equipment
- IR 04027160; Byron EP 2017 Pre-exercise – Exercise Management and Control
- IR 04027175; Byron EP 2017 Pre-exercise – Procedure Issues
- IR 04027167; Byron EP 2017 Pre-exercise – Other Issues

40A1 Performance Indicator Verification

- 2BOSR 4.13.1-1, Revision 31; Reactor Coolant System Water Inventory Balance Surveillance Computer Calculation
- ER-AP-331-1003, Revision 9; RCS Leakage Monitoring and Action Plan

4OA2 Problem Identification and Resolution

- IR 04008243; NRC ID: 0B VC Chiller Surge Tank Piping Supports Misaligned
- IR 03955974; DC Cook Cracks in EDG Fuel Injector Pump DVH
- EN 52456; Emergency Diesel Generators Declared Inoperable
- IR 03972747; 2016 Byron Station Annual Rework Report
- IR 03990691; 1E MPT Group1 Cooling Fans Supply Breaker Trip
- Maintenance Rule (a)(1) Determination Report 3997379; dated 5/30/17; Function MP-04
- IR 03991415; 1E MPT Cooling Group 1 Troubleshooting Results
- BAR 1-19-B10, Revision 9; MAIN FMR 1E OIL TEMP HIGH/TROUBLE
- BAR 1-19-B10, Revision 10; MAIN FMR 1E OIL TEMP HIGH/TROUBLE
- BAR 1-19-B10, Revision 11; MAIN FMR 1E OIL TEMP HIGH/TROUBLE
- BAR 1-19-B10, Revision 12; MAIN FMR 1E OIL TEMP HIGH/TROUBLE
- BAR 1-19-B10, Revision 13; MAIN FMR 1E OIL TEMP HIGH/TROUBLE
- 1BGP 100-3A12, Revision 0; HYUNDAI TRANSFORMER OPERATION TABLES
- BOP MP-30, Revision 0; Acknowledging Alarms on the Unit 1 MPT Transformer Monitoring System
- BOP MP-30, Revision 1; Acknowledging Alarms on the Unit 1 MPT Transformer Monitoring System
- BOP MP-30, Revision 2; Acknowledging Alarms on the Unit 1 MPT Transformer Monitoring System
- WO 1689053; Main Power Transformer (MPT) Replacement Unit 1 (East); EC 396050
- CC-AA-256, Revision 4; Process for Managing Plant Modifications Involving Digital Instrumentation & Control Equipment and Systems
- CC-AA-256-101, Revision 2; Software Quality Assurance Process For Plant Digital Instrumentation and Control Systems and Components
- Standing Order 17-013, Effective Date 3/29/17; Clarification for 1E & 1W MPT Temperature Indications and Limitations
- Standing Order 17-013, Effective Date 4/12/17; Clarification for 1E & 1W MPT Temperature Indications and Limitations
- Standing Order 17-013, Effective Date 5/18/17; Clarification for 1E & 1W MPT Temperature Indications and Limitations

4OA3 Event Followup

- LER 454-2017-001-00, Byron Station Unit 1 Volumetric and Surface Examinations of Reactor Pressure Vessel Had Penetration Nozzles Identify Indications Attributed to Primary Water Stress Corrosion Cracking and Minor Subsurface Void Enlargement from Operating Stresses
- IR 03981686; UT Indications Discovered in Penetration 76
- IR 03982084, B1R21M5 CRDM Penetrations – Additional UT Indications Discovered
- IR 03981261; Unacceptable PT Indications on P31
- IR 03987122; Rx Head Repair Unable to Install Penetration 76 Funnel
- IR 03984457; Grinding Marks Found in Penetration 76 CETC Nozzle
- IR 03984513; Scored Weld Overlay for Penetration 76
- IR 03984350; Grinding Marks Found in Penetration 74 CETC Nozzle
- WO 4608043; B1R21 Buff/Weld Repair to Weld Overlay on 1RC01R
- ECR 427882; B1R21 Buff/Weld Repair to Weld Overlay on 1RC01R

LIST OF ACRONYMS USED

AF	Auxiliary Feedwater
ASME	American Society of Mechanical Engineers
BAR	Alarm Response Procedure
CAP	Corrective Action Program
CB	Condensate Booster
CFR	<i>Code of Federal Regulations</i>
CS	Containment Spray
CT	Current-Turns Ratio
DRP	Division of Reactor Projects
DVH	Delivery Valve Holder
ECCS	Emergency Core Cooling Systems
EDG	Emergency Diesel Generator
HV	High Voltage
IR	Inspection Report
IR	Issue Report
IST	In-service Test
LER	Licensee Event Report
LV	Low Voltage
MCC	Motor Control Center
MCR	Main Control Room
MPT	Main Power Transformer
MWe	Megawatts-electric
NEI	Nuclear Energy Institute
NRC	U.S. Nuclear Regulatory Commission
PI	Performance Indicator
PM	Planned or Preventative Maintenance
PMT	Post-Maintenance Testing
PWSCC	Primary Water Stress Corrosion Cracking
RCS	Reactor Coolant System
RD	Control Rod Drive
RH	Residual Heat Removal
RPV	Reactor Pressure Vessel
SDP	Significance Determination Process
SX	Essential Service Water
TS	Technical Specification
TSC	Technical Support Center
UFSAR	Updated Final Safety Analysis Report
WO	Work Order