UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
2443 WARRENVILLE RD. SUITE 210
LISLE, ILLINOIS 60532-4352

August 7, 2018

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 05000454/2018002 AND 05000455/2018002

Dear Mr. Hanson:

On June 30, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed an integrated inspection at your Byron Station, Units 1 and 2. On July 11, 2018, the NRC inspectors discussed the results of this inspection with Mr. T. Chalmers 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 issue that was evaluated under the risk significance determination process as having very low safety significance (Green). The NRC has also determined that a violation is associated with this issue. Because an issue report was initiated to address this issue, this violation is being treated as a Non-Cited Violation (NCV), consistent with Section 2.3.2 of the Enforcement Policy. The NCV is described in the subject inspection report. Further, the inspectors documented a licensee-identified violation which was determined to be of very low safety significance in this report. The NRC is treating this violation as a NCV consistent with Section 2.3.2.a of the Enforcement Policy.

If you contest the violations or significance of these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555–0001; with copies to the Regional Administrator, Region III; the Director, Office of Enforcement; and the NRC Resident Inspectors' Office at the Byron Station.

If you disagree with a cross-cutting aspect assignment or a 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 Inspectors' Office at the Byron Station.

This letter, its enclosure, and your response (if any) will be made available for public inspection 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 Duncan, Chief
Branch 3
Division of Reactor Projects

Docket Nos. 50–454; 50–455
License Nos. NPF–37; NPF–66

Enclosure:
IR 05000454/2018002; 05000455/2018002

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Letter to Bryan Hanson from Eric Duncan dated August 7, 2018

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Numbers:	50–454; 50–455
License Numbers:	NPF–37; NPF–66
Report Numbers:	05000454/2018002; 05000455/2018002
Enterprise Identifier:	I–2018–002–0025
Licensee:	Exelon Generation Company, LLC
Facility:	Byron Station, Units 1 and 2
Location:	Byron, IL
Dates:	April 1, 2018 through June 30, 2018
Inspectors:	J. McGhee, Senior Resident Inspector C. Hunt, Resident Inspector D. Betancourt, Braidwood Resident Inspector C. Thompson, Resident Inspector, Illinois Emergency Management Agency
Approved by:	E. Duncan, Chief Branch 3 Division of Reactor Projects

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring licensee performance by conducting an integrated quarterly inspection at Byron Station Units 1 and 2 in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to https://www.nrc.gov/reactors/operating/oversight.html for more information. NRC-identified and self-revealed findings, violations, and additional items are summarized in the table below. A licensee-identified non-cited violation (NCV) is documented in report section IP 71152 – Problem Identification and Resolution.

List of Findings and Violations

Overspeed Trip of 2B Auxiliary Feedwater Pump During Surveillance			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000455/2018002–01 Open/Closed	[H.12] – [Avoid Complacency]	71152
A finding of very low safety significance and an associated NCV of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures and Drawings," was self-revealed when the 2B diesel-driven auxiliary feedwater (AF) pump tripped on overspeed during a quarterly inservice test (IST). Specifically, operators with portable instrumentation used an erroneous speed value to adjust pump speed beyond the range specified in the procedure resulting in a pump overspeed trip, entry into a 72-hour technical specification (TS) required action statement, and unplanned pump unavailability with an associated change in Unit 2 risk from green to yellow.			

Additional Tracking Items

None.

PLANT STATUS

Byron Unit 1 operated at scheduled power levels for the entire inspection period.

Byron Unit 2 operated at scheduled power levels for the entire inspection period.

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors performed plant status activities described in IMC 2515 Appendix D, "Plant Status," and conducted routine reviews using IP 71152, "Problem Identification and Resolution." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

REACTOR SAFETY

71111.01—Adverse Weather Protection

Summer Readiness (1 Sample)

The inspectors evaluated summer readiness of offsite and alternate alternating current (AC) power systems.

71111.04—Equipment Alignment

Partial Walkdown (3 Samples)

The inspectors evaluated system configurations during partial walkdowns of the following systems/trains:

(1) 2A containment spray (CS) train following planned maintenance on April 10, 2018;
(2) 2A Auxiliary Feedwater (AF) train following an unplanned overspeed trip and unavailability of the 2B AF pump on April 17, 2018; and
(3) 1A AF train during planned maintenance on the 1B AF pump on May 21, 2018.

71111.05AQ—Fire Protection Annual/Quarterly

Quarterly Inspection (5 Samples)

The inspectors evaluated fire protection program implementation in the following selected areas:

(1) Unit 2 Main Steam and AF pipe tunnels (Fire Zone 18.3–2) on April 5, 2018;
(2) Unit 2 Division 21 switchgear room (Fire Zone 5.2–2) on April 13, 2018;
(3) Unit 2 Division 22 switchgear room (Fire Zone 5.1–2) on April 13, 2018;

(4) Auxiliary building 346'–0" elevation general area (Fire Zone 11.2–0) on May 10, 2018; and
(5) 0A and 0B essential service water (SX) cooling tower electrical substations and SX cooling towers on May 16, 2018.

71111.11—Licensed Operator Requalification Program and Licensed Operator Performance

Operator Requalification (1 Sample)

The inspectors observed and evaluated the operating crew "D" simulator evaluation scenario on June 5, 2018.

71111.12—Maintenance Effectiveness

Routine Maintenance Effectiveness (3 Samples)

The inspectors evaluated the effectiveness of routine maintenance activities associated with the following equipment and/or safety significant functions:

(1) Steam generator (SG) atmospheric pressure control (Function MS–11) following several SG power-operated relief valve (PORV) issues identified in September 2017 and March 2018;
(2) 4160 volt safety-related buses, protection and circuit breakers (Function AP–01) during a review of an undervoltage instrumentation surveillance extension from 18 months to 36 months in April 2018; and
(3) All chemical and volume control system (CVCS) functions for the previous 2-year period prompted by a May 2018 licensee screening review for system classification in preparation for implementation of a 10 CFR 50.69 program for risk informed categorization and treatment of structures, systems, and components.

71111.13—Maintenance Risk Assessments and Emergent Work Control (8 Samples)

The inspectors evaluated the risk assessments for the following planned and emergent work activities:

(1) 1B SX pump work on March 27, 2018, following the identification of errors in risk assessment software, on April 11, 2018;
(2) Emergent failure and repair of main control room ventilation damper 0VC024Y on April 12, 2018;
(3) Emergent trip of the 2B AF pump during surveillance testing on April 13, 2018;
(4) Protected equipment walkdown prior to a 2A SX pump work window, on April 30, 2018;
(5) Station auxiliary transformer (SAT) 242 outage extension due to emergent bushing oil leak, on May 15, 2018;
(6) SAT 242–1 and 242–2 out-of-service for testing and bus electrical realignment, on May 24, 2018;
(7) Protected equipment walkdown during the 2B emergency diesel generator work window the week of June 17, 2018; and
(8) Emergent trip of the "A" train direct current (DC) 111 battery charger during the "B" train work week, on June 27, 2018.

71111.15—Operability Determinations and Functionality Assessments (7 Samples)

The inspectors evaluated the following operability determinations and functionality assessments:

(1) AR 04118828; 1B SI [Safety Injection] Pump Inboard Oil Sump Losing Level, on April 4, 2018;
(2) AR 04139855; 1AF004B Failed Its Stroke Time Test, on May 22, 2018;
(3) AR 04140600; Westinghouse Part 21 for CRDM [Control Rod Drive Mechanism] Thermal Sleeves, on May 23, 2018;
(4) AR 04142617; Acceptance Criteria Not Clearly Listed in Diesel Fuel Oil Pump Procedure, on May 30, 2018;
(5) AR 04145568; Extent of Condition of Braidwood Issue Report 4145407 (Diesel Generator Air Filters Failed Dedication Testing), on June 15, 2018;
(6) AR 04147753; (DC Bus 111) 1DC03E CB1 Breaker Open, on June 16, 2018; and
(7) AR 04148497; 2B Diesel Generator Polarization Index Low, on June 25, 2018.

71111.19—Post Maintenance Testing (6 Samples)

The inspectors evaluated the following post maintenance tests:

(1) 2BOSR 5.5.8.SX.5–1c, Comprehensive Inservice Testing Requirements for Essential Service Water Pump 2SX01PA and Unit 2 SX Pumps Discharge Check Valve, Revision 9, on May 1, 2018, following a planned work window;
(2) 1BOSR 3.2.8–610A, ESFAS [Engineered Safety Features Actuation System] Instrument Slave Relay Surveillance and Automatic Actuation Test (Train A Automatic Safety Injection–K610), Revision 8, on May 10, 2018, following a 1A and 1C Reactor Containment Fan Cooler (RCFC) work window;
(3) 0BOSR 7.9.6–1, SX Pump 0A Monthly Operability Surveillance, Revision 40, performed June 7, 2018 following a planned work window;
(4) Ground check on 125 volt direct current (VDC) Bus 211 following emergent isolation and repair of an auxiliary building booster fan breaker light socket using WO 04796285, 0VA03CF Trip Light Broken, on June 14, 2018;
(5) 1BOSR8.6.1–1, Unit One 125V DC Battery Bank and Charger 111 Operability Weekly Surveillance, following emergent circuit breaker replacement for the DC 111 battery charger, on June 17, 2018; and
(6) 1BHSR 8.4.2–1, Unit 1 Bus 111 125V Battery Charger Operability, Revision 1, on June 28, 2018, following charger card replacement and edge connector repair.

71111.22—Surveillance Testing

The inspectors evaluated the following surveillance tests:

Routine (2 Samples)

(1) 1BOSR 8.1.12–2, 1B Diesel Generator ESF Actuation Test Start and Non-Emergency Trip Bypass Test and Generator Differential Relay Test, Revision 10, on April 18, 2018; and
(2) 1BOSR 3.2.8–644B, ESFAS Instrumentation Slave Relay Surveillance (Train B Automatic Containment Spray – K644), Revision 3, on April 26, 2018;

Inservice (4 Samples)

(1) 1BOSR 5.5.8.CS.5–2C, Comprehensive Inservice Testing (IST) Requirements for Containment Spray Pump 1CS01PB, Revision 5, on April 26, 2018;
(2) 1BOSR 5.5.8.CC.5–1C Comprehensive Inservice Testing Surveillance (IST) Requirements for Component Cooling Pump 1CC01PA, Revision 6, on May 8, 2018;
(3) 1BOSR 5.5.8.RH.5–1, Group A Inservice Testing (IST) Requirements for Residual Heat Removal Pump 1RH01PA, on May 10, 2018; and
(4) 1BOSR 5.5.8.SI.5–2A, Group A Inservice Testing (IST) Requirements for Safety Injection Pump 1SI01PB, on May 31, 2018;

71114.06—Drill Evaluation

Emergency Planning Drill (1 Sample)

The inspectors evaluated the 2018 Byron Station off-year emergency planning exercise on May 22, 2018.

OTHER ACTIVITIES – BASELINE

71151—Performance Indicator Verification (4 Samples)

The inspectors verified the licensee performance indicators submittals listed below:

(1) MS05: Safety System Functional Failures (SSFFs) – 2 Samples (Unit 1 and Unit 2 from April 1, 2017 through March 31, 2018); and
(2) BI02: Reactor Coolant System (RCS) Leak Rate – 2 Samples (Unit 1 and Unit 2 from April 1, 2017 through March 31, 2018).

71152—Problem Identification and Resolution

Semiannual Trend Review (1 Sample)

The inspectors reviewed the licensee's corrective action program for trends that might be indicative of a more significant safety issue. The review focused on plant barrier impairment control program issues, the condition of plant barriers, and the adequacy of compensatory measures for active impairments or recently impaired/degraded barriers. Additionally, the review examined the duration of impaired barriers and the timeliness of licensee actions to resolve conditions or activities that impaired the fire barriers. No significant issues or trends were identified.

Annual Follow-Up of Selected Issues (2 Samples)

The inspectors reviewed the licensee's implementation of its corrective action program related to the following issues:

(1) AR 04127424; Pump Trip During ASME [American Society of Mechanical Engineers] Surveillance, dated April 16, 2018; and
(2) AR 04134044; NRC ID: Potential Trend with Test Equipment, dated May 29, 2018.

INSPECTION RESULTS

71152—Problem Identification and Resolution

Overspeed Trip of 2B Auxiliary Feedwater Pump During Surveillance			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Mitigating Systems	Green FIN 05000455/2018002–01 Open/Closed	[H.12] – [Avoid Complacency]	71152

A finding of very low safety significance and an associated non-cited violation (NCV) of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was self-revealed when the 2B diesel-driven auxiliary feedwater (AF) pump tripped on overspeed during the quarterly inservice test (IST). Specifically, operators with portable instrumentation used an erroneous speed value to adjust pump speed beyond the range specified in the procedure resulting in a pump overspeed trip, entry into a 72-hour technical specification (TS) required action statement, and unplanned pump unavailability with an associated change in Unit 2 risk from green to yellow.

Description:

The 2B AF pump consists of a diesel engine prime mover with a shaft-driven essential service water (SX) booster pump, a power take off (PTO) gear increaser, and the AF pump itself. An engine speed of 1800 revolutions per minute (rpm) results in an SX pump speed of 1800 rpm and an AF pump speed of 3600 rpm. The AF pump has an overspeed trip setpoint of 3800 rpm.

On April 16, 2018, operators performed the IST surveillance for the 2B diesel-driven AF pump and shaft-driven SX booster pump in accordance with 2BOSR 5.5.8AF.5–2b, "Unit Two Group B Inservice Testing (IST) Requirements for Diesel Driven Auxiliary Feedwater Pump 2AF01PB." During that activity, operators using a portable tachometer established a reference AF pump speed between 3617 and 3689 rpm before recording the AF pump data. Minor adjustments were then required to engine speed to obtain the SX booster pump data with a reference speed between 1789 and 1825 rpm. When the surveillance data collection was completed, the surveillance directed the operators to verify the AF pump speed or reset it to the reference value range. When the operators checked the pump speed using portable instrumentation, they obtained a reading of 2800 rpm. Although this obtained reading was much lower than expected, the operators failed to critically question this reading and attempted to raise pump speed using the diesel engine governor adjust control switch on the local panel to return the pump to the reference speed of 3600 rpm. When the indicated machine speed on the test instrument did not change as expected after the first attempt, the operators attempted to raise speed a second time and the diesel engine tripped on overspeed.

Corrective Actions: Troubleshooting was performed and the machine was inspected to ensure it was not damaged due to operation above its rated speed before being returned to service. The pump was restarted about 2-1/2 hours after the trip and was verified to be operating correctly. The operators received remedial training on the use of the instrumentation and expectations for communication with supervision when expected results are not obtained after operating plant equipment. Additionally, the shift managers reviewed this event with all operators, reinforcing the use of human performance error prevention tools and operating expectations for engaging supervision and communicating unexpected results.

Corrective Action Reference: AR 04127424; Pump Trip During American Society of Mechanical Engineers (ASME) Surveillance

Performance Assessment:

Performance Deficiency: The improper use of a portable tachometer resulted in operators improperly adjusting 2B AF diesel engine speed, resulting in a 2B AF pump overspeed trip.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Human Performance attribute of the Mitigating Systems Cornerstone and adversely impacted the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, operator action to adjust engine speed with questionable instrument indications caused a pump overspeed trip that resulted in unplanned pump unavailability with an associated change in Unit 2 risk from green to yellow.

Significance: The inspectors assessed the significance of the finding using SDP Appendix A, "The Significance Determination Process (SDP) for Findings at Power," Exhibit 2, "Mitigating Systems." The inspectors answered questions in paragraph A.1 through A.4 "No" and the issue screened as having very low safety significance (i.e., Green).

Cross-cutting Aspect: The finding had a cross-cutting aspect in the Avoid Complacency component of the Human Performance cross-cutting area (H.12), which stated that the licensee will recognize and plan for the possibility of mistakes, latent issues, and inherent risk, even while expecting successful outcomes. Individuals implement appropriate error reduction tools. For this issue, the operators recognized that the indicated speed of the pump was significantly farther outside the expected range than they anticipated for the manipulations performed; however, they decided to raise pump speed without communicating to supervision or using readily available alternate indications such as the uncalibrated speed indicator above the governor control switch or indicated pump flow to determine the appropriate course of action.

Enforcement:
Violation: Title 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires, in part, the activities affecting quality shall be prescribed by procedure and accomplished in accordance with the procedure. Procedure 2BOSR 5.5.8AF.5-2b, "Unit Two Group B Inservice Testing (IST) Requirements for Diesel Driven Auxiliary Feedwater Pump 2AF01PB," Step F.4.a.1 stated, "Verify/Reset the AF pump speed to 3617 – 3689 RPM."

Contrary to the above, on April 16, 2018, operators failed to verify/reset AF pump speed to 3617 – 3689 rpm in accordance with 2BOSR 5.5.8AF.5-2b resulting in an engine trip on overspeed.

Disposition: This violation is being treated as a NCV, consistent with Section 2.3.2 of the Enforcement Policy.

Licensee Identified Non-Cited Violation	71152
A violation of very low safety significance was identified by the licensee, has been entered into the licensee's corrective action program, and is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy.	

Violation: Title 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. Instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished.

Licensee procedure ER–AA–321, Administrative Requirements for Inservice Testing, stated in Step 4.10.5, that "acceptance criteria are established using the reference values and the applicable ASME [American Society of Mechanical Engineers] Code. Paragraph ISTA–3160, "Test and Examination Procedures," of the ASME Operation and Maintenance of Nuclear Power Plants (OM) Code required in part that, "Tests and examinations shall be performed in accordance with written procedures. The procedures shall contain the Owner-specified reference values and acceptance criteria." Paragraph ISTA–9230, "Inservice Test and Examination Results," of the ASME OM Code required, in part, that "The results of tests and examinations shall be documented and shall include the following: comparison with allowable ranges of test and examination values, and analysis deviations and requirements for corrective action."

Contrary to the above, from July 1, 2016, to May 30, 2018, the licensee's procedures did not clearly document acceptance range, alert range, and required action values for the diesel oil (DO) transfer pump IST surveillance tests in accordance with the ASME OM Code. This resulted in several instances where the pump being tested did not meet IST criteria, but no action was taken.

Significance/Severity Level: The inspectors determined the performance deficiency was more than minor because it was associated with the Procedural Quality attribute of the Mitigating Systems Cornerstone and adversely impacted the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to clearly identify the acceptance criteria, alert range and required action ranges resulted an in organizational failure to declare the pumps inoperable and to perform required analysis of the equipment's condition. The inspectors assessed the significance of the finding using SDP Appendix A and concluded the issue was of very low safety significance (i.e., Green).

Corrective Action References: (1) AR 04142617, Acceptance Criteria Not Clearly Listed in DO Pump Procedures, and (2) AR 04142370, DO Pump Test Packages are Not Routed to the IST Coordinator.

Minor Violation – Failure to Perform IST Surveillances in Accordance with Written Procedures Appropriate for the Circumstances	71152

Minor Violation: The inspectors identified multiple instances of a failure to perform inservice testing in accordance with written procedures appropriate for the circumstances during this inspection period:

1. On March 30, 2018, the licensee performed 1BOSR 5.5.8.DO–2, "Test of the Diesel Oil Transfer System," and declared the 1B diesel oil transfer pump inoperable due to flow results being low out of specification. Subsequently, the licensee determined that the instrument setup was incorrect in that an incorrect value was entered into the flow meter for pipe diameter. The licensee declared the surveillance invalid and scheduled a time to re-perform the activity. Acceptable system flow rates were achieved a week later when the correct pipe diameter was used for the instrument setup.

2. On April 26, 2018, while observing the licensee perform 2BOSR 5.5.8.CS.5–2C, "Comprehensive Inservice Testing (IST) Requirements for Containment Spray Pump 1CS01PB," the inspectors noted that the pump suction pressure and discharge pressure test gauges were not installed as described in the "Precautions and Limitations" section of the procedure. After the inspectors asked how the installed configuration satisfied the procedure requirement, the licensee suspended the test to obtain clarification. After some deliberation between engineers and operators attempting to identify the correct instrument location, the test data was recorded with the instruments at different locations for data gathering and comparison. The licensee verified that pump performance had sufficient margin, including the introduced error, to remain operable and available to perform its safety-related function as expected.

3. On May 1, 2018, while observing the licensee perform 2BOSR 5.5.8.SX.5–1C, "Comprehensive Inservice Testing (IST) Requirements for the Essential Service Water (SX) Pump 2SX01PA and Unit 2 SX Pumps Discharge Check Valves," the inspectors noted that operators were not taking data from the ultrasonic flow meter in accordance with the procedure. Specifically, the instrument was not set up to indicate time and flow so that an average flow could be determined as required by a Note in the procedure. Instead the operators were recording instantaneous flowrate. When the inspector asked for clarification and the operators and technicians deferred to their supervisors, the licensee suspended the test to obtain clarification. The test was performed again after the instrument was set up correctly and operators were briefed on how to obtain the correct data.

Title 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality shall be prescribed by documented instructions of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions. Contrary to the above, for the diesel fuel oil transfer pump surveillance, 1BOSR 5.5.8.DO–2, the procedure listed an incorrect pipe diameter value that was subsequently entered into the flow meter resulting in unacceptable test results; for the containment spray pump surveillance, 2BOSR 5.5.8.CS.5–2C, the licensee potentially introduced an unaccounted for error in the surveillance test method by not setting up test equipment in accordance with the procedure; and for the SX surveillance, 2BOSR 5.5.8.SX.5–1C, the licensee introduced a potential error in the surveillance test by not determining an average flow rate as discussed in the procedure Note.

Screening: The failure to perform inservice testing in accordance with written procedures appropriate for the circumstances was a performance deficiency in each of the listed

examples. The performance deficiency was determined to be minor in each case because the inspectors answered "No" to all of the more-than-minor screening questions in IMC 0612, Appendix B. The licensee generated the following issue reports (IRs) to document these issues:

- AR 04121539, Ultrasonic Flow Measurement Installation Issue
- AR 04122295, PCR [procedure change request] – 1/2BOSR 5.5.8.DO–1
- AR 04131201, Engineering Clarification Needed on ASME Precaution
- AR 04133585, NRC ID: Potential Concerns With Execution of 2A SX Pump Surveillance

Violation: These failures to comply with 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," constituted minor violations that are not subject to enforcement action in accordance with the NRC's Enforcement Policy.

Observation – Programmatic Weaknesses Observed in the IST Program	71152

The licensee's IST program is designed to ensure that the applicable requirements of 10 CFR 50.55a are met with respect to the ASME OM Code. The Green finding and associated NCV, licensee-identified NCV and the minor violations listed in the previous sections of this report are indicative of weaknesses in the execution of the IST program at Byron Station.

In these examples, the inspectors noted specific gaps in measuring and test equipment (M&TE) use, procedure quality, and procedural adherence that resulted in non-compliances with the IST program and the ASME OM Code or would have likely resulted in a non-compliance had the inspectors not intervened through questioning the licensee staff. Additionally, the inspectors noted a lack of overall ownership on the part of the licensee staff responsible for both oversight and implementation of the IST program at the site. This was illustrated through a general complacency with regards to M&TE set up and use, the lack of a questioning attitude on the part of personnel performing actions when abnormal indications were present, a lack of rigor in implementing actions to effect timely change in the organization, and a general lack of knowledge of IST program requirements and the basis for those requirements.

In response to the inspectors' observations, the licensee initiated AR 04134044, NRC ID: Potential Trend With Test Equipment, and AR 04154533, Adverse Trend Identified With ASME Performance Issues. In addition, the licensee instituted additional interim instructions for execution and oversight of IST/ASME program surveillance procedures in the form of Operating Standing Orders.

EXIT MEETINGS AND DEBRIEFS

The inspectors confirmed that proprietary information was controlled to protect it from public disclosure. No proprietary information was documented in this report.

- On July 11, 2018, the inspectors presented the quarterly integrated inspection results to Mr. T. Chalmers and other members of the licensee staff.

DOCUMENTS REVIEWED

71111.01—Adverse Weather Protection
- WC-AA-107, Seasonal Readiness, Revision 20
- 0B0A ELEC-1, Degraded Switchyard Voltage Unit 0, Revision 15
- Byron Certification of 2018 Summer Readiness letter, #2018-0043, dated June 15, 2018
- AR 04151400; NRC ID – Material in Switchyard; 6/28/2018
- AR 04151385; Switchyard & Transformer Yard Housekeeping

71111.04—Equipment Alignment
- BOP AF-M2A, Auxiliary Feedwater System Train "A" Valve Lineup, Revision 7
- BOP AF-E2A, Auxiliary Feedwater System Train "A" Electrical Lineup, Revision 1
- BOP CS-M2, Containment Spray System Valve Lineup, Revision 11
- 2BOSR 5.5.8.CS.5.5-1c, Comprehensive Inservice Testing (IST) Requirements of Containment Spray Pump 2CS01PA, Revision 6
- BOP AF-M1, Auxiliary Feedwater System Valve Lineup, Revision 19
- M-37, Diagram of Auxiliary Feedwater

71111.05AQ—Fire Protection Annual/Quarterly
- Pre-Fire Plan #42; Fire Zone 5.1-2, Auxiliary Building 426'-0" Elevation, Division 22 ESF Switchgear Room; Revision 2
- Pre-Fire Plan #44; Fire Zone 5.2-2, Auxiliary Building 426'-0" Elevation, Division 21 ESF Switchgear Room; Revision 3
- Pre-Fire Plan #198; Fire Zone 18.3-2, Auxiliary Building 377'-0" Elevation, Unit 2 Main Steam and Auxiliary Feedwater Pipe Tunnel; Revision 3
- Pre-Fire Plan #100; Fire Zone 11.2-0 Southwest, Auxiliary Building 346'-0" Elevation, General Area-SW; Revision 2
- Pre-Fire Plan #101; Fire Zone 11.2-0 West, Auxiliary Building 346'-0" Elevation, General Area-W; Revision 2
- Pre-Fire Plan #99; Fire Zone 11.2-0 South, Auxiliary Building 346'-0" Elevation, General Area-S; Revision 2
- Pre-Fire Plan #102; Fire Zone 11.2-0 North, Auxiliary Building 346'-0" Elevation, General Area-N; Revision 2
- Pre-Fire Plan #98; Fire Zone 11.2-0 Northwest, Auxiliary Building 346'-0" Elevation, General Area-NW; Revision 2
- Pre-Fire Plan #209; Fire Zone 18.14B-1/2 AND 17.2-2; 0A SX Cooling Tower Electrical Substation/ SX Cooling Tower; Revision 2
- Pre-Fire Plan #207; Fire Zone 18.14A-1/2 AND 17.2-1; 0B SX Cooling Tower Electrical Substation/ SX Cooling Tower; Revision 2

71111.11—Licensed Operator Requalification Program and Licensed Operator Performance
- Out-of-the-Box Scenario for licensed operator training cycle 4 week of 6/5/2018.

71111.12—Maintenance Effectiveness
- AR 04048820, LED #5 (Inhibit LED) Lit for 1A PORV; 09/04/2017
- Failure Classification Form for AR 04048820; 09/21/2017
- AR 04115515, Cable Found Damaged on 2A PORV; 03/16/2018
- MS-11 Summary Evaluation for previous 2-year period; 04/16/2018
- AR 04119573; Possible Cable Degradation Associated with 1MS018B; 03/27/2018
- AP-01 Summary Evaluation for Previous 2-year period; 04/26/2018
- Surveillance Test Interval Evaluation BY-17-002; Revision 000

- BB-STI-018, Risk Evaluation of Surveillance Interval Extension For 4.16kV Emergency Bus Under Voltage (UV) and Degraded Voltage (DV) Relay Tests; Revision 1
- ER-AA-569; 10 CFR 50.69 Program; Revision 0
- ER-AA-569-1005; Integrated Decision-Making Panel for Risk Informed SSC Categorization Duties and Responsibilities; Revision 1
- Maintenance Rule System Basis Document for Function CV-01
- CV-01 Summary Evaluation for Previous 2-year period; 04/2018
- Maintenance Rule System Basis Document for Function CV-04
- CV-04 Summary Evaluation for Previous 2-year period; 04/2018
- Maintenance Rule System Basis Document for Function CV-07
- CV-07 Summary Evaluation for Previous 2-year period; 04/2018
- Maintenance Rule System Basis Document for Function CV-08
- CV-08 Summary Evaluation for Previous 2-year period; 04/2018
- Maintenance Rule System Basis Document for Function CV-15
- CV-15 Summary Evaluation for Previous 2-year period; 04/2018

71111.13—Maintenance Risk Assessments and Emergent Work Control
- AR 04127424; Pump Trip During ASME Surveillance
- 2BOSR 5.5.8.AF.5-2b; Unit Two Group B Inservice Testing (IST) Requirements for Diesel Driven Auxiliary Feedwater Pump 2AF01PB; Revision 9
- AR 04125775; 0VC024Y Failed Open; 4/12/2018
- AR 04118349; Paragon Reporting Incorrect Results for SX Pumps; 3/23/2018
- AR 04132611; NRC ID – Incomplete Protected Equipment List; 4/30/2018
- OP-AA-108-117; Protected Equipment Program; Revision 5
- AR 04150787, Loss of DC Battery Charger 111; 6/27/2018

71111.15—Operability Determinations and Functionality Assessments
- ECR 434037; Need Engineering to Evaluate Thread, 2/20/2018
- AR 01419956; 1AF004A Fails STT During 1BOSR 7.5.5-1, 9/29/2012
- 1BOSR 3.2.12-2, Automatic SI Actuated Equipment Response Time Test (AF Valves), Revision 0
- EC 385278, Multiple Spurious Operation (MSO) – Scenario 27 1AF004A/B Install Valve to Isolate Air to Close Side, Revision 001
- AR 04140999; Westinghouse Part 21 For CRDM Thermal Sleeves; 05/24/2018
- AR 01588536; Unit 2 CRDM Centering Tab Abnormalities; 11/21/2013
- AR 00614585; Unit 2 Reactor Vessel Head Thermal Sleeves; 4/8/2007
- AR 02460211; Byron Station Review of CAE-15-15/CCE 15-16/RGE-15-15 – TB-07; 2/27/2015
- AR 02598510; OPEX Eval Westinghouse Project Letter TB-07-2, Revision 3; 2/10/16
- AR 02598221; Byron Station Review of TB-07, Rev 3/CAE-15-58; 12/10/2015
- Westinghouse LTR-NRC-18-34, dated May 23, 2018; Notification of the Potential Existence of Defects Pursuant to 10 CFR Part 21
- Westinghouse Technical Bulletin TB-07-2 Revision 3, dated December 7, 2015; Reactor Vessel Head Adapter Thermal Sleeve Wear
- EC 624381; Review of Westinghouse CRDM Thermal Sleeve Part 21; Revision 0
- AREVA Metrology Services Information Record Letter 142-9278017-000; Byron Unit 1 CRDM Thermal Sleeve As-Found Dimensional Report; dated 10/27/2017
- ER-AA-321, Attachment 4, Pump Evaluation Form; Revision 12
- AR 04142370; DO Pump Test Packages are Not Routed to the IST Coordinator; 5/30/2018;
- 1BOSR 5.5.8.DO-1, Test of the Diesel Oil Transfer System; Revision 4;
- 2BOSR 5.5.8.DO-1, Test of the Diesel Oil Transfer System; Revision 5;

- AR 04147868; 4.0 Critique – Battery 111 Charger AC Input (CB1) Tripped; 6/16/2018

71111.19—Post Maintenance Testing
- AR 04133585; NRC ID Potential Concerns With Execution of 2A SX Surv; 5/1/18
- AR 04134044; Potential Trend with Test Equipment; 5/3/18
- AR 04143544; DC Bus 211 High Grounds; 6/1/2018
- AR 04146902; DC Bus 211 Grounds Degraded; 6/13/2018
- Main Control Room Logs dated June 13 and 14, 2018
- WO 04796285; 0VA03CF Trip Light Broken; 6/14/2018
- AR 04147868; 4.0 Critique – Battery 111 Charger AC Input (CB1) Tripped; 6/17/2018
- Main Control Room Logs dated June 16 and 17, 2018
- WO 04797235; Test/Replace MCCBs; 6/17/2018
- AR 04145267; Return Fuel Line Leaking on 0A SX M/U PP; 6/7/2018
- AR 04145509; NRC ID: Missed Opportunity to Perform EOC Inspection; 6/8/2018
- WO 04801145; Loss of DC Battery Charger 111; 6/28/2018
- WR 01399650; Loss of DC Battery Charger 111; 6/27/2018

71111.22—Surveillance Testing
- AR 04131201; Engineering Clarification Needed on ASME Precaution; 4/26/2018
- AR 04136714; 1BOSR 5.5.8.RH.5.1A Instrument Issue; 5/11/2018
- BYR 98-211; Residual Heat Removal (RHR) ECCS Pump Flow and Accuracy Evaluation, Revision 0B

71114.06—Drill Evaluation
- Licensee event timeline and expected actions for pre-exercise drill on 5/22/2018
- AR 04144920; Byron EP Off-year Exercise – CR/SIM Performance Issues; 6/6/2018
- AR 04144940; Byron EP Off-year Exercise – TSC Performance; 6/6/2018
- AR 04144961; Byron EP Off-year Exercise – OSC Performance; 6/6/2018
- AR 04144972; Byron EP Off-year Exercise – Exercise Management and Control; 6/6/2018
- AR 04144977; Byron EP Off-year Exercise – Facilities and Equipment Issues; 6/6/2018
- AR 04144979; Byron EP Off-year Exercise – Procedure Quality Issue; 6/6/2018
- AR 04144981; Byron EP Off-year Exercise – Fleet Assessment Observations; 6/6/2018

71151—Performance Indicator Verification
- NEI 99-02, Revision 7; Regulatory Assessment Performance Indicator Guideline
- Main Control Room Logs

71152—Problem Identification and Resolution
- CC-AA-211; Fire Protection Program; Revision 8
- CC-AA-201; Plant Barrier Control Program; Revision 12
- OP-MW-201-007; Fire Protection System Impairment Control; Revision 7
- BAP 1100-3; Plant Barrier Impairment (PBI) Program; Revision 24
- BAP 1100-3A3; Pre-evaluated Plant Barrier Matrix; Revision 41
- AR 04039778; NOSA-BYR-17-09, Byron Station Fire Protection Audit, 10/13/2017
- BOP AF-7; Diesel Driven Auxiliary Feedwater Pump B Startup on Recirc; Revision 55
- 2BOSR Z.7.a.1; Diesel Engine Starting Sequence and Overspeed Trip Test; Revision 06
- 2BOSR 7.5.4-2, Diesel Driven Feedwater Pump Monthly Surveillance; Revision 26
- AR 04147243; Flowmeter Installed at Wrong Location; 6/14/2018
- AR 04141940; NRC ID Documentation of Maintenance on 2B AF Pump Following Overspeed Trip; 5/29/2018