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

September 13, 2018

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

SUBJECT: BRAIDWOOD STATION, UNITS 1 AND 2—NRC BIENNIAL PROBLEM IDENTIFICATION AND RESOLUTION INSPECTION REPORT 05000456/2018010 AND 05000457/2018010

Dear Mr. Hanson:

On August 3, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed a problem identification and resolution inspection at your Braidwood Station, Units 1 and 2. On that date, the NRC team discussed the results of this inspection with Ms. A. Ferko, Plant Manager, and other members of your staff. The results of this inspection are documented in the enclosed report.

The NRC inspection team reviewed the station's corrective action program and the station's implementation of the program to evaluate its effectiveness in identifying, prioritizing, evaluating, and correcting problems, and to confirm that the station was complying with NRC regulations and licensee standards for corrective action programs. Based on the samples reviewed, the team determined that your staff's performance in each of these areas adequately supported nuclear safety. However the team identified a weakness in the effectiveness of corrective actions taken to resolve problems. Specifically, several issue reports (IRs) that the team reviewed were coded as complete in the corrective action process, but remained open in other processes, or were closed to actions with informal accountability requirements.

The team also evaluated the station's processes for the use of industry and NRC operating experience information and the effectiveness of the station's audits and self-assessments. Based on the samples reviewed, the team determined that your staff's performance in each of these areas adequately supported nuclear safety.

Finally, the team reviewed the station's programs to establish and maintain a safety conscious work environment and interviewed station personnel to evaluate the effectiveness of these programs. Based on the team's observations and the results of these interviews the team found no evidence of challenges to your organization's safety conscious work environment. Your employees appeared to be willing to raise nuclear safety concerns through at least one of the several means available.

The NRC team did not identify any finding or violation of more than minor significance.

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 R. Duncan, Chief
Branch 3
Division of Reactor Projects

Docket Nos. 50–456; 50–457
License Nos. NPF–72; NPF–77

Enclosure:
IR 05000456/2018010; 05000457/2018010

cc: Distribution via ListServ®

Letter to Bryan C. Hanson from Eric Duncan dated September 13, 2018

SUBJECT: BRAIDWOOD STATION, UNITS 1 AND 2,—NRC BIENNIAL PROBLEM IDENTIFICATION AND RESOLUTION INSPECTION REPORT 05000456/2018010 AND 05000457/2018010

DISTRIBUTION:
Christopher Cook
RidsNrrDorlLpl3
RidsNrrPMBraidwood Resource
RidsNrrDirsIrib Resource
Steven West
Darrell Roberts
Richard Skokowski
Allan Barker
DRPIII
DRSIII
ROPreports.Resource@nrc.gov

ADAMS Accession Number: ML18257A024

OFFICE	RIII		RIII					
NAME	JRutkowski:lg		EDuncan					
DATE	9/12/2018		9/13/2018					

OFFICIAL RECORD COPY

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Numbers:	50–456; 50–457
License Numbers:	NPF–72; NPF–77
Report Numbers:	05000456/2018010; 05000457/2018010
Enterprise Identifier:	I–2018–010–0001
Licensee:	Exelon Generation Company, LLC
Facility:	Braidwood Station, Units 1 and 2
Location:	Braceville, IL
Dates:	July 16 through August 3, 2018
Inspectors:	J. Rutkowski, Project Engineer (Team Leader) D. Betancourt, Resident Inspector V. Meghani, Reactor Inspector V. Petrella, Reactor Inspector M. Porfirio, 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's performance by conducting a problem identification and resolution inspection at Braidwood 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.

List of Findings and Violations

No findings or violations were identified.

Additional Tracking Items

Type	Issue Number	Title	Report Section	Status
PD	05000456/2018010–001 and 05000457/2018010–001	Minor Performance Deficiency (PD)—Operability Evaluation Closed Before Completion of Corrective Actions	71152 – Corrective Actions	Discussed

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedure (IP) 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 team 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

71152—Problem Identification and Resolution (1 Sample)

The team performed a biennial assessment of the licensee's corrective action program (CAP), use of operating experience, self-assessments and audits, and safety conscious work environment. The assessment is documented below.

(1) Corrective Action Program Effectiveness: Problem Identification, Problem Prioritization and Evaluation, and Corrective Actions (CAs) – The inspection team reviewed the station's CAP and the station's implementation of the CAP to evaluate its effectiveness in identifying, prioritizing, evaluating, and correcting problems, and to confirm that the station was complying with NRC regulations and licensee standards for corrective action programs.

(2) Operating Experience and Self-Assessments and Audits – The team evaluated the station's processes for the use of industry and NRC operating experience information and the effectiveness of the station's audits and self-assessments.

(3) Safety Conscious Work Environment – The team reviewed the station's programs to establish and maintain a safety conscious work environment, and interviewed station personnel to evaluate the effectiveness of these programs.

INSPECTION RESULTS

71152—Problem Identification and Resolution

Observation—Corrective Action Program Effectiveness	71152
Corrective Action Program: Based on the samples reviewed, the team determined that the staff's performance in each of these areas adequately supported nuclear safety. The team identified a weakness in the effectiveness of corrective actions taken to resolve problems. Specifically, several issue reports (IRs) that the team reviewed were coded as "Complete" in the corrective action process, but remained open in other processes, or were closed to actions with informal accountability requirements. For example, several IRs were considered complete because a work request (WR) was generated to address the problem identified, but upon reviewing the WR the team identified that either a work order (WO) had not yet been created, or that a WO was created, but had been subsequently canceled. Although these discrepancies did not impact any safety-related equipment or adversely affect the plant, the team could not readily determine the reason for canceling these WOs absent additional inquiry. As an example of this issue, the team reviewed a number of IRs generated and	

addressed by the licensee's Training Department. Two of these IRs were closed to actions that were not clearly explained in the corrective action closure report in the CAP. The Training Department CAP Coordinator subsequently responded to the team's questions regarding these IRs and provided an adequate basis for the actions that were taken to close the issues.

Effectiveness of Problem Identification: Overall, the station was effective at identifying issues at a low threshold and was properly entering them into the CAP as required by station procedures. The team determined that the station was generally effective at identifying negative trends that could potentially impact nuclear safety. The team walked down portions of the auxiliary feedwater system, the component cooling water system, the emergency diesel generators, the essential service water system, and the 4 kilovolt (kV) and 480 volt (V) electrical switchgear. For the areas reviewed, the team did not identify any issues in the area of problem identification.

Effectiveness of Prioritization and Evaluation of Issues: In-depth reviews of IRs, WOs, and cause evaluations were completed for a 5–year time period for the safety-related emergency diesel generators and 4 kV safety-related switchgear. The team determined that the licensee had established a low threshold for entering deficiencies into the CAP for these systems, that the issues were generally being appropriately prioritized and evaluated for resolution, and that CAs were implemented to mitigate the future risk of issues occurring that could affect overall system operability and/or reliability.

As part of the walk down and review of the essential service water system, the team reviewed CAs associated with piping degradation that was self-revealed through numerous through-wall piping leaks. The licensee had developed an essential service water piping health plan that included a prioritized list of planned inspections and piping replacements. The team concluded that the essential service water piping issues were being adequately monitored and prioritized.

Effectiveness of Corrective Actions: The team concluded that the licensee was generally effective in developing CAs that were appropriately focused to correct the identified problem and to address the root and contributing causes for significant conditions adverse to quality to preclude repetition. The licensee generally completed CAs in a timely manner and in accordance with procedural requirements commensurate with the safety significance of the issue. For NRC-identified issues, the team determined that the licensee generally assigned CAs that were effective and timely.

In one instance, however, the team identified that the procedurally required review of completed corrective actions had not been performed for a 2011 NRC-identified violation. Specifically, as documented in AR 1254636, "NRC Green Finding – Failure to Analyze Design of the AF [Auxiliary Feedwater] System," the assigned corrective action was completed in 2012; however, the effectiveness review of those actions had been extended 18 times and was still open at the end of this inspection. The team concluded that although the corrective action appeared to correct the cause of the violation, the failure to perform a timely review adversely impacted the basis for performing the effectiveness review.

The team also reviewed corrective actions associated with a non-cited violation (NCV) associated with the failure to correctly design and prevent high energy line break (HELB) secondary missiles and for the errors contained in the analysis of record for a main steam line HELB. Following that review, the team identified a performance deficiency related to the closure of the associated operability evaluation as described below.

Minor Performance Deficiency—Operability Evaluation Closed Before Completion of Corrective Actions	71152

Minor Performance Deficiency: Issues involving the "Failure to Design/Prevent Secondary HELB Missiles, and Errors in Analysis of Record for MS [Main Steam] Line HELB," were documented as NCVs in NRC inspection report 05000456/2017008; 05000457/2017008. The licensee entered these issues into their CAP as AR 04075641, AR 04086419, and AR 04086455.

Operability Evaluation 17–002, "Unanalyzed Consequence from a MSLB [Main Steam Line Break] Outside Containment," documented the operability of the affected components and CA 04086455–05 was created to restore compliance with the design basis as described in Section 3.6.1.2 of the Braidwood Updated Final Safety Analysis Report (UFSAR). This CA required the development of a new main steam line pressurization analysis to evaluate the pressure response assuming the removable roof slabs in the main steam line valve isolation rooms did not lift and to determine the need for physical restraints for these removable slabs.

Operability Evaluation 17–002 used engineering judgment in some cases and the licensee subsequently performed a technical evaluation to support this engineering judgment. Based on the results of this technical evaluation, the licensee closed the operability evaluation. The team determined that the licensee's closure of the operability evaluation was not in accordance with Exelon procedural requirements.

Section 4.1.18 of Exelon procedure OP–AA–108–115, "Operability Determinations," Revision 21, stated, in part:

> "When the nonconforming and/or degraded condition has been resolved by corrective action or accepted "as is" with a completed 10 CFR 50.59 review or operability of the SSC [structure, system, or component] is no longer supported or required, then: APPROVE closure of the OpEval…"

Operability Evaluation 17–002 was closed without meeting the above requirements. Specifically, the CA for performing a main steam line pressurization re-analysis was still open, and therefore the CA had not been completed; the technical evaluation used as a basis for the closure of the operability evaluation did not include a 10 CFR 50.59 review; and the components potentially impacted by a main steam line break were still required to be operable.

Screening: Using the IMC 0612, Appendix B, More-than-Minor screening questions, the team determined that the issue was of only minor safety significance because the existing technical evaluations demonstrated operability. Additionally, CA 04086455–05 to perform a re-analysis to restore conformance with the design basis remained open. The licensee subsequently entered this issue into their CAP as AR 04161329 – "PI&R Procedure Adherence With Op Eval 17–002 Closure."

Operating Experience and Self-Assessments and Audits Observation	71152
Operating Experience and Self-Assessments and Audits: Based on the samples reviewed, the team determined that the station's performance in each of these areas adequately supported nuclear safety. In particular, the team concluded, overall, that operating experience was adequately evaluated for applicability and that appropriate actions were implemented to address lessons learned, as needed. In general, the team determined that the licensee was effective at performing self-assessments and audits to identify issues at a low level, properly evaluated those issues, and resolved them commensurate with their safety significance. The team also noted that in some cases the self-assessments performed focused on procedural compliance rather than the overall effectiveness of the program; however, this did not result in any actual equipment or operational issues.	

Safety Conscious Work Environment Observation	71152
Safety Conscious Work Environment: The team found no evidence of challenges to the organization's safety conscious work environment. Employees appeared willing to raise nuclear safety concerns through at least one of the several means available. The team observed various morning planning meetings, meetings to review new IRs, and interviewed station personnel both individually and in focus groups. Additionally, the team interviewed the Employee Concerns Coordinator and reviewed recent case logs and case files.	

EXIT MEETINGS AND DEBRIEFS

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

On August 3, 2018, the team presented the biennial problem identification and resolution inspection results to Ms. A. Ferko, Braidwood Plant Manager, and other members of the licensee staff.

DOCUMENTS REVIEWED

71152—Problem Identification and Resolution

- Action Request (AR) 4010851; Trend in Processing of PM Changes; 05/15/2017
- AR 2615400; Inadequate Test Methodology for AF PP Suction Press Loops; 01/21/2016
- AR 2705092; NES-MS-04.1; Inadequate Change Management Resulted in Scaffolds Built Without the Required Engineering Evaluation; 09/22/2016
- AR 2686762; OPEX Review NRC IN 2016-08; 09/15/2016
- AR 4063858; Radwaste Self-Assessment; 10/17/2017
- AR 4077797; SA NRC 71124.01 Occupational ALARA Planning and Controls; 11/28/2017
- AR 2612914; Unexpected Indication During 2PSL-AF051 Functionality; 01/15/2016
- AR 2703967; Scaffold Build Deficiencies; 08/13/2016
- AR 2705092; CB&I NCS MS-04.1 Rev. 1 Knowledge Gap ID; 08/16/2016
- AR 2734948; Maintenance Response to NRC IN 2016-08 Gap; 10/31/2016
- WC-AA-106; Work Screening and Processing; Revision 18
- MA-AA-796-024; Scaffold Installation, Inspection, and Removal; Revision 11
- NOSA-BRW-18-01, Maintenance Functional Area Audit Report; 03/08/2018
- NOSA-BRW-17-06; Radiation Protection Audit Report; 08/02/2017
- NOSA-BRW-17-04; CAP Audit Report; 03/29/2017
- NOVA-17-002; Fleet Evaluation of Exelon Midwest; June 5-9, 2017

- AR 02722783; Root Cause Investigation–Level 2 Clearance and Tagging Event; 10/01/2016
- AR 04132973; CAPE Report; Adverse Trend in Clearance and Tagging Event; 05/01/2018
- AR 04038298; Trend in Latent Issues Due to Gap in Historical Reviews; 08/02/2017
- AR 03953846; Self-Assessment – SX Piping Health Plan Check-In; 04/14/2017
- AR 03963996; Self-Assessment – Configuration Control; 09/17/2017
- AR 02589930; Heavy General Corrosion on 0SXH2AA 6" in 0SX165A Pit; 11/19/2015
- AR 04001297; OSP-A 2B AF Pump SX Return Piping Leak; 04/22/2017
- AR 02689352; Trending – Operations IR Generation and Documentation; 07/05/2016
- AR 02688291; Trend – Engineering 2Q2016 Performance; 07/01/2016
- NOSA-BRW-18-05, Engineering Programs and Station Blackout Audit Report; 05/16/2018
- NOSA-BRW-17-08, Operations Functional Area Audit Report; 09/15/2017
- Engineering Change (EC) 622424; Impact of a Main Steam Line Break on the Removable Roof Slab on the MSIV Rooms; Revision 0
- EC 623380; Impact of Removable Slabs Falling on the MSSV Roof; Revision 0
- EC 619274; Operability Evaluation 17-001 – Pin Hole Leak in 2SXA9A-6"; 04/25/2017
- SX Piping Health Plan Update; 07/31/2017
- Issue Report (IR) 989516; Potential Non-Conservative DO Tech Spec 3.8.3; 11/05/2009
- IR 1120846; 4.0 Crew Critique Unit 1 Reactor Trip; 10/01/2010
- IR 1169814; Hand Calorimetric Procedure 1/2 BwOSR 3.3.1.2-2 Enhancement; 02/01/2011
- IR 1192980; NER 11-009 – Deficiency/Enhancement; 1/2SX169A/B Direction; 03/27/2011
- IR 1295320; Rod Drive Surveillance Enhancement; 11/29/2011
- IR 1318823; Create Procedural Guidance for TRM 3.3.E Required Action; 01/27/2012
- IR 1399005; Possible Condenser Vacuum Leak Issue; 09/09/2012
- IR 1532547; 8-Fold Predicted Criticality Outside of Administrative Band; 07/04/2013
- IR 1559075; A1R17LL Need WO Scope Enhanced for MSR RV Drain Lines; 09/16/2013
- IR 2438001; Action Plan to Extend Main Turbine RV/IV Test Frequency; 01/15/2015
- IR 2437854; Remove Valve Actuator Box Cover for Inspection – 1MS5004A; 01/15/2015
- IR 2437856; Remove Valve Actuator Box Cover for Inspection – 2MS5004C; 01/15/2015
- IR 2501820; Through Wall Leak Downstream of 1SX007; 05/17/2015
- IR 2512997; EOC Examination from Leak on 1SX03A of 2SX03A; 06/10/2015
- IR 2512999; EOC Examination from Leak on 1SX03A of 0SX03A; 06/10/2015
- IR 3949609; (A)(1) Determination Required for AP-04 (AP4); 12/05/2016
- IR 4042901; Abnormalities Observed with Unit 1 Main Generator; 08/17/2017
- IR 4141635; RW-11 Piping Separation; 05/27/2018
- Work Order (WO) 1847075; EOC Examination from Leak on 1SX03A of 2SX03A; 02/24/2017
- WO 1847077; EOC Examination from Leak on 1SX03A of 0SX03A; 02/01/2018
- WO 1891809; EOC Examination from Leak on 1SX03A of 0SX03A; 03/16/2018
- IR 4068617; 2017 Equipment Reliability Evaluation; 10/30/2017
- IR 4087455; UAT 141-2 Low Oil Level Alarm Received; 12/27/2017
- IR 4103318; Braidwood EP Pre-Exercise – Failed Facility Objective B.6; 02/12/2018
- IR 4116653; Issues Identified During VS/VC Crosstie Walkdown; 03/19/2018
- IR 4125225; Oil Viscosity Low on 0DG01K; 04/10/2018
- IR 2712545; EP – Early Siren Activation; 09/06/2016
- IR 3999431; Conditional Release of Tube Bundle for 2TO01AB; 04/18/2017
- IR 4120720; CO2 Injection Fails One Pump Mod Test; 03/29/2018
- IR 4134012; Excavation Required for U1 and U2 CO2 Injection at LSH; 05/03/2018
- IR 2672653; Trng: Trend Identified with ILT SRO-I Losses; 05/23/2016
- IR 2691920; Trng: Performance EP Failure (DEP); 07/12/2016

- IR 2710825; 7300 N-1 Mod Radio Interference Potential; 08/31/2016
- IR 4078828; Ovations Upgrade Adverse Results in Simulator ANSI Test; 11/29/2017
- IR 4149494; NOS ID Invalid Authentication of Training Record; 06/22/2018
- EC 622424; Technical Evaluation for MSSV House Removable Roof Slab Lift; 04/20/2018
- IR 4075641; Green NCV – Potential Green NCVs from the NRC 2.206 Petition Inspection; 11/16/2017
- IR 4086452; Green NCV – Untimely Corrective Action for Secondary Missiles; 12/21/2017
- IR 2506005; Documentation of EDG Exhaust Pipe Minimum Wall; 05/27/2015
- IR 2519208; 2A DOST Tank Valve 2DO001A Leakage Impacts 2B EDG; 06/24/2015
- IR 2635537; Need WO for Additional UT of DG Exhaust Stack; 03/03/2016
- IR 3982772; Documentation of 2A EDG Exhaust Stack UT; 03/07/2017
- IR 4128714; OSP-A Loss of ESF Bus 141 During 1A EDG Sequencer Testing; 04/19/2018
- IR 4129712; OSP-A 1A DG Secured During 1BwOSR 3.8.1.19-1; 04/22/2018
- BwHS 4002-072; Cleaning and Inspection of Electrical Equipment, Revision 11
- BwMP 3100-02; Diesel Generator 2 Year Inspection, Revision 36
- MA-BR-773-300; Diesel Generators Relay Routine, Revision 7
- MA-BR-EM-4-09070; Diesel Generator Electrical Inspection, Revision 16
- AR 04052607; 0LI-CF071 Screen Display Is Black; 09/15/2017
- AR 02674553; 2016 REMP Broad Leaf Vegetation Open Issue; 05/26/2016
- AR 04072014; LEVEL 3 OPEX Review Required; 11/07/2017
- AR 02614924; Missed REMP Samples 3rd and 4th Quarter 2015; 01/20/2016
- RCR 4020644; Water Containing Tritium Pumped to Ground; Revision 5
- CAPE 4010851; Trend in Processing of PM Changes; 06/12/2017
- NOSA-BRW-16-02; Security Programs Audit Report; 02/03/2016
- NOSA-BRW-16-04; Chemistry, Radwaste, Effluent and Environmental Monitoring Audit Report; 07/13/2016
- NOSA-BRW-17-02; Security Programs Audit Report; 02/01/2017
- AR 4074980; Chemical Control Program Assessment; 04/02/2018
- AR 3985485; Pre-NRC Self-Assessment: Protective Strategy Evaluation; 06/16/2017
- AR 2727290; Pre-NRC Inspection 71130.02, 71130.08, & 71151; 01/04/2017
- EFR 04013337-40; Elevated Steam Generator Blowdown Impurities; 07/05/2018
- AR 04002540; NRC ID: Broadleaf Vegetation Not Sampled in 2015; 04/25/2017
- AR 03968800; Perform Formal Level 3 OPEX Review Per PI-AA-115-1003; 01/31/2017
- AR 02707258; Request Level 3 OPEX Review of ICES 323780; 08/22/2016
- AR 04104083; ENV-ID CHEM Control Blitz Results for Cabinet MS-003; 02/14/2018
- AR 04028449; Trend on Unit 1 SGBD Sodium and Chloride; 06/30/2017
- AR 02702875; Security – Turnover Trend; 08/10/2016
- AR 03962969; Chemistry HU/THU OBE Results; 01/13/2017
- AR 04022573; Security: Equipment Trend on SD 504 (S&L 434); 06/16/2017
- AR 04010851; Trend in Processing of PM Changes; 05/15/2017
- AR 04020644; H3 Water Being Pumped onto Surrounding Ground; 06/08/2017
- AR 04025024; NER NC-17-015-R, Water Containing Tritium Pumped to Ground; 06/23/2017
- BwOP WX-902; Use of Portable Sump Pumps for Non-Installed Sump Pump Application; Revision 1
- BwOP WX-900; Use Of Portable Sump Pumps Within Station Sumps; Revision 12
- Logs; ECP; 2016; 12/31/2016
- Logs, ECP; 2017; 12/31/2017

- Logs; ECP; 2018; 08/01/2018
- ECP File; Case File 2017-001; 2017
- ECP File; Case File 2017 C-13; 2017
- Survey; Organization Effectiveness Survey; 08/31/2017