



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

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

November 18, 2020

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

SUBJECT: BRAIDWOOD GENERATING STATION – DESIGN BASIS ASSURANCE
INSPECTION (PROGRAMS) INSPECTION REPORT 05000456/2020012 AND
05000457/2020012

Dear Mr. Hanson:

On October 23, 2020, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Braidwood Generating Station and discussed the results of this inspection with Mr. J. Keenan, Site Vice President and other members of your staff. The results of this inspection are documented in the enclosed report.

No findings or violations of more than minor significance were identified during this inspection.

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 Title 10 of the *Code of Federal Regulations* 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Karla K. Stoedter, Chief
Engineering Branch 2
Division of Reactor Safety

Docket Nos. 05000456 and 05000457
License Nos. NPF-72 and NPF-77

Enclosure:
As stated

cc w/ encl: Distribution via LISTSERV®

Letter to Bryan C. Hanson from Karla K. Stuedter dated November 18, 2020.

SUBJECT: BRAIDWOOD GENERATING STATION – DESIGN BASIS ASSURANCE
INSPECTION (PROGRAMS) INSPECTION REPORT 05000456/2020012 AND
05000457/2020012

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| DATE | 11/17/2020 | 11/18/2020 | | | |

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**U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report**

Docket Numbers: 05000456 and 05000457

License Numbers: NPF-72 and NPF-77

Report Numbers: 05000456/2020012 and 05000457/2020012

Enterprise Identifier: I-2020-012-0019

Licensee: Exelon Generation Company, LLC

Facility: Braidwood Generating Station

Location: Braceville, IL

Inspection Dates: October 05, 2020 to October 23, 2020

Inspectors: J. Benjamin, Senior Reactor Inspector
I. Hafeez, Reactor Inspector
E. Sanchez Santiago, Senior Reactor Inspector

Approved By: Karla K. Stodter, Chief
Engineering Branch 2
Division of Reactor Safety

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting a design basis assurance inspection (programs) inspection at Braidwood Generating Station, 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 of more than minor significance were identified.

Additional Tracking Items

None.

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 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.

Starting on March 20, 2020, in response to the National Emergency declared by the President of the United States on the public health risks of the coronavirus (COVID-19), regional inspectors were directed to begin telework. Regional based inspections were evaluated to determine if all or a portion of the objectives and requirements stated in the IP could be performed remotely. For the inspection documented below portions of the IP were completed remotely as well as on site and all the objectives and requirements for completion of the IP were met.

REACTOR SAFETY

71111.21N.02 - Design-Basis Capability of Power-Operated Valves Under 10 CFR 50.55a Requirements

POV Review (IP Section 03) (9 Samples)

The inspectors:

- a. Determined whether the sampled power operated valves (POVs) listed below are being tested and maintained in accordance with NRC regulations along with the licensee's commitments and/or licensing bases.
- b. Determined whether the sampled POVs are capable of performing their design-basis functions.
- c. Determined whether testing of the sampled POVs is adequate to demonstrate the capability of the POVs to perform their safety functions under design-basis conditions.
- d. Evaluate maintenance activities including a walkdown of the sampled POVs (if accessible).

- (1) 2RY455A, Pressurizer Power Operated Relief Valve
- (2) 1MS001B, Steam Generator Main Steam Isolation Valve
- (3) 1RH8716A, Residual Heat Removal Pump Discharge Crosstie Isolation Valve
- (4) 1CC685, Component Cooling from Reactor Coolant Pumps Thermal Barrier Isolation Valve
- (5) 1RH8701B, Reactor Coolant Loop 1A to Residual Heat Removal Pump 1A Isolation Valve
- (6) 1SX007, Essential Service Water Supply Valve to Common Component Cooling Heat Exchanger
- (7) 2SD002B, Steam Generator Blowdown Upper/Lower Isolation Valve
- (8) 2RC014C, Reactor Head Vent Isolation Valve

(9) 1SI8801B, Charging to Cold Leg Injection Valve

INSPECTION RESULTS

No findings were identified.

EXIT MEETINGS AND DEBRIEFS

The inspectors verified no proprietary information was retained or documented in this report.

- On October 23, 2020, the inspectors presented the design basis assurance inspection (programs) inspection results to Mr. J. Keenan, Site Vice President and other members of the licensee staff.

DOCUMENTS REVIEWED

| Inspection Procedure | Type | Designation | Description or Title | Revision or Date |
|----------------------|---|--------------------------|---|------------------|
| 71111.21N.02 | Calculations | 10.2.117 | Copes Vulcan Air Operated Control Valves Design Report | 9 |
| | | BRW-01-0153-E | Environmental Parameters of EQ Zones | 2 |
| | | BRW-01-0153-E /BYR01-068 | Environmental Parameters of EQ Zones | 2 |
| | | BRW-95-059 | Braidwood 1&2 CC System MOV Differential Pressure Calculation | 1 |
| | | BRW-97-0821-M | Safety Injection MOV Differential Pressure Calculation | 0 |
| | | BRW-98-0392-M | Residual Heat Removal System (RHR) MOV Differential Pressure Calculation | 0 |
| | | BRW-98-0596-E | Generic Thermal Overload Heater Sizing Calculation for Motor Operated Valves | 12/05/1998 |
| | | BRW-98-0718-E | Motor Operated Valves (MOV) Actuator Motor Terminal Voltage & Thermal Overload Sizing Calculation - Component Cooling (CC) System | 0 |
| | | BRW-98-0721-E | Motor Operated Valves (MOV) Actuator Motor Terminal Voltage and Thermal Overload Sizing Calculation-Residual Heat Removal (RH) System | 02/23/1999 |
| | | BRW-98-0723-E | Motor Operated Valves Actuator Motor Terminal Voltage and Thermal Overload Sizing Calculation | 0 |
| | | BRW-98-0724E | Motor Operated Valve (MOV) Actuator Motor Terminal Voltage and Thermal Overload Sizing Calculation-SX System | 0 |
| | | CQD-012298 | Review of Seismic Qualification Test Report for 1" Solenoid Valves (1&2RC014A-F) | 0 |
| | | EMD-030608 | Review of a Stress Analysis Report for a Valcor 1-inch Solenoid Valve for Braidwood Station | 1 |
| | | ENC-QE-51.D | Seismic Qualification Reevaluation of the Safety Injection Motor Operated Valves | 2 |
| | | EQ-BB-027 | Limatorque MOV Actuators Outside Containment | 10 |
| EQ-BB-047 | Environmental Qualification of Borg Warner Valves | 7 | | |
| EQ-BB-084 | Limatorque Motor Operators (RH Insulation) | 6 | | |
| EQ-GEN023 | Environmental Qualification of Namco Control Limit Switch | 15 | | |

| Inspection Procedure | Type | Designation | Description or Title | Revision or Date |
|----------------------|---|----------------|--|------------------|
| | | | Series | |
| | | EQ-GEN023 | Environmental Qualification of Namco Control Limit Switch Series | 15A |
| | | EQ-GEN040 | Environmental Qualification of Valcor V526 Series Solenoid Valves | 7 |
| | | EQDP-MECH | Westinghouse - Environmental Qualification of Pumps and Valves | 11 |
| | | F-2756 | Main Steam Isolation Valves | 1 |
| | Corrective Action Documents | 2479735 | OSP-R Degraded Grease Conditions Noted in 1RH8701B | 04/04/2015 |
| | | 2567440 | OSP-A Valve Dual Indication When Open (2SD002D) | 10/08/2015 |
| | | 4004530 | OSP-P MLB 4 GRP3 12.2 2SD002F Status Light Not Working | 04/30/2017 |
| | | 4183361 | OSP-R 2SI8801A Mechanical Grease Inspection Grade 3 | 10/14/2018 |
| | | 4219454 | Stem Adapter Replacement on 1SX005 | 02/12/2019 |
| | | 4304505 | Leak off the 2SD002H Valve | 12/17/2019 |
| | Corrective Action Documents Resulting from Inspection | 4375109 | NRC ID - POV Inspection W/D - 1SX005 | 10/07/2020 |
| | | 4378979 | Braidwood DBAI Power Operated Valves - Observations | 10/23/2020 |
| | Drawings | 2000003 | Air Cylinder Assembly Spring Loaded Fail Closed 2 Inch Globe Valve | C |
| | | 20E-1-4018A | Relaying & Metering Diagram 4160V ESF Switchgear Bus 141 | X |
| | | 20E-1-4019A | Relaying & Metering Diagram 480V ESF Switchgear Bus 131X | K |
| | | 20E-1-4030CC04 | Schematic Diagram CCW From Reactor Coolant Pumps Thermal Barrier Isolation Valves 1CC9438 & 1CC685 | N |
| | | 20E-1-4030EH06 | Schematic Diagram Residual Heat Removal Heat Exchanger 1A & 1B Crosstie Valves 1RH8716A & 1RH8716B | 03/31/1978 |
| | | 20E-1-4030RH04 | Schematic Diagram RC Loop 1A to RHR Pump Isolation Valves 1RH8701A & RH88701B | Q |
| | | 20E-1-4030SI06 | Schematic Diagram Boron Injection Tank Discharge Isolation Valves 1SI8801A & 1SI8801B | L |

| Inspection Procedure | Type | Designation | Description or Title | Revision or Date | |
|----------------------|---------------------------|----------------|---|---|----|
| | | 20E-1-4687D | External Wiring Diagram 480V Auxiliary Building ESF MCC 132X4 Section D | K | |
| | | 20E-1-4689A | External Wiring Diagram 480V Auxiliary Building ESF MCC 132X5 1AP32E | N | |
| | | 20E-1-4883 | Internal-External Wiring Diagram Motor Operated Valves System SI | L | |
| | | 4030MS02 | Schematic Diagram Main Steam Isolation Valve 1MS001B | 06/16/1981 | |
| | | 8376D49 | 4in - 1525lb Motor Operated Gate Valve 4-GM78FN | 3 | |
| | | D-268832 | Spec.# L-2700220 Model D-100-160 Actuator 3" Class 1500 Valve Assembly | 01/30/1984 | |
| | | M-135 | Diagram of Reactor Coolant Loop -1 Unit 2 | BG | |
| | | M-35 | Diagram of Main Steam | 07/19/1976 | |
| | | M-48 | Diagram of Waste Disposal Steam Generator Blowdown | AU | |
| | | M-61 | Diagram of Safety Injection | AJ | |
| | | M-62 | Diagram of Residual Heat Removal | 05/05/1976 | |
| | | Miscellaneous | 1RH8701B | Rising STEM Motor Operated Valve Datasheet (RSMDS) | 4 |
| | | | EQ-BB-027 | Valve Operator, Class RH Motors, Inside Containment | 10 |
| | | | EQ-BB-084 | Motor Operators (RH Insulation) | 6 |
| | | | EQ-BB-104 | Environmental Qualification of Limitorque Motor Operators (LR Insulation) | 6 |
| | F-2702 SO 386 Receipt Log | | F-2702 Shop Order 386 Construction F-2802.0386 PO 130631 Westinghouse Receipt Log Electrical System | 01/01/1960 | |
| | L-0352 | | Instruction Manual for Main Steam Isolation Valves | 05/01/1987 | |
| | L-0785 | | Valcor - Operation and Maintenance Manual | 1 | |
| | MOV-DB-BRW-CC | | Component Cooling Water System | 2 | |
| | Procedures | 1BWEP ES1.3 | Transfer to Cold Leg Recirculation Unit 1 | 301 | |
| | | 2BWOA SEC-4 | Loss of Instrument Air Unit 2 | 107 | |
| | | ER-AA-300 | Motor-Operated Valve Program Administrative Procedure | 12 | |
| | | ER-AA-300-1001 | MOV Program Performance Indicators | 14 | |
| | | ER-AA-302 | Motor-Operated Valve Program Engineering Procedure | 7 | |
| | | ER-AA-302-1001 | MOV Rising Stem Motor Operated Valve Thrust and Torque Sizing and Set-Up Window Determination | 11 | |

| Inspection Procedure | Type | Designation | Description or Title | Revision or Date |
|----------------------|---------|---|--|---|
| | | | Methodology | |
| | | ER-AA-302-1003 | MOV Margin Analysis and Periodic Verification Test Intervals | 10 |
| | | ER-AA-302-1004 | Motor-Operated Valve Performance Trending | 13 |
| | | ER-AA-302-1006 | Motor-Operated Valve Maintenance and Testing Guidelines | 19 |
| | | ER-AA-321 | Administrative Requirements for Inservice Testing | 13 |
| | | ER-AA-321-1006 | Inservice Testing of Motor Operated Valves | 4 |
| | | ER-AA-410 | Air Operated Valve Categorization | 6 |
| | | ER-AA-410-1000 | Air Operated Valve Design Basis Review and Setpoint Control | 2 |
| | | ER-AA-410-1002 | Air Operated Valve Testing Requirements | 3 |
| | | ER-AA-410-1003 | Air Operated Valve Tracking and Trending Requirements | 3 |
| | | ER-AA-410-1004 | Air Operated Valve Program Performance Indicators | 11 |
| | | Work Orders | 1061054 | 1RH8716A Perform Grease/Mech Inspection |
| | | 1098849 | 1SX007 Perform Grease/Mech Inspection | 01 |
| | | 1218481 | Perform Grease Inspection on Gearcase & Gearbox | 01 |
| | | 1327459 | 1RH8716A MOV Age Related Inspection & T Drain Plug | 01/26/2013 |
| | | 1369261 | EQ Overhaul | 09/26/2011 |
| | | 1381327 | Replace 1B MSIV Actuator Hydraulic Air Filter, Air, Oil Pump | 09/04/2011 |
| | | 1395294 | 1RH8716A Lubricate Valve Stem | 09/04/2011 |
| | | 1422495 | EQ Replacement of Air Operator Diaphragm | 07/31/2012 |
| | | 1520796 | 1SI8801B Motor Operated Valve Diagnostic Test | 09/01/2013 |
| | | 1521152 | 1RH8716A Motor Oprtd Vlv Diag Test | 01/26/2013 |
| | | 1521183 | 1TIS-PS120 Sec Cooling Loop Outlet Temp of Sec Analysis Sys | 02/09/2013 |
| | | 1657661 | IST-STT-2RY455A/456 PORV Vlv Stroke | 04/18/2014 |
| | | 1674294 | 1SI8801B ODEN Breaker 1AP32E Tripped OOT | 09/05/2014 |
| | 1739095 | IST-PIT-2SD002A-GH Containment Isolation Valves Operability | 03/22/2016 | |
| | 1740805 | IST-LT-2SD02B-H U2 LLRT of Lower S/G B/D | 09/22/2015 | |
| | 1822275 | IST-SIT-1SI8801B/SI8802B/SI8809B/RH8716N-U1 Train B | 07/03/2015 | |

| Inspection Procedure | Type | Designation | Description or Title | Revision or Date |
|----------------------|------|-------------|--|------------------|
| | | | SI SVAG | |
| | | 1823250 | IST-1SI8801A/8802A/1RH8716A-SI Svag Vlv Stk Qtrly | 09/16/2016 |
| | | 1825073 | IST-PIT-8801B-U1 Train B SI Isolation Valve Indication Test | 10/10/2016 |
| | | 1826736 | U1 Main Steam Isol 1MS001A/B/C/F Valve Indication 18 MO | 09/22/2016 |
| | | 1837043 | IST-1MS001A-D MSIV Full Stroke | 09/19/2016 |
| | | 1838870 | MVR-Degraded Grease Conditions Noted in 1RH8701B | 10/22/2019 |
| | | 1873657 | IST-PIT-2SD002A-H Containment Isolation Valves Operability | 08/23/2017 |
| | | 1880981 | IST-STT-PIT 2RC014A Stroke Test | 02/11/2016 |
| | | 1957684 | U1 Train B Safety Injection System SVAG Valve Stroke | 12/30/2016 |
| | | 1957951 | 1SI8801 Indication Test | 03/29/2018 |
| | | 1959023 | IST-1SI8801A/8802A/8809A/1RH8716A-SI Svag Vlv Stk Qtrly | 04/03/2018 |
| | | 1959319 | IST-PIT-8701A/8701B/8716A-1A Rh Suct & Disch Xtie Vlvs | 04/03/2018 |
| | | 1963132 | IST-1MS001A-D MSIV Full Stroke | 04/02/2018 |
| | | 1965829 | IST-PIT-1MS001A/B/C/D CNMT Isolation Valve Indication | 04/05/2018 |
| | | 4643566 | IST STT-PTT-2RC014A Stroke Test | 09/09/2017 |
| | | 4774634 | IST-1SI8801A/8802A/8809A/1RH8716A-Si Svag Valve Stroke Quarterly Su | 10/04/2019 |
| | | 4774638 | U1 Train B Safety Injection System SVAG Valve Stroke | 07/10/2018 |
| | | 4777315 | 1SI8801B Indication Test | 09/01/2019 |
| | | 4851953 | IST-STT-PIT 2RC014A Stroke Test | 05/06/2020 |
| | | 4853291 | IST-LT-2SO002B/D/F/H - U2 LLRT OF LOWER S/G B/O, W: 2BWOSR 5.5.8.SD-1B | 05/06/2020 |
| | | 4893081 | IST-STT-2SD002A-H & 2SD005A-D -S/G B/D CNMT ISOL VALVES | 06/20/2019 |
| | | 506783 | 1SX007 Perform Insp and Prvny MNT on LMTTQ VLV OPRTR | 01 |
| | | 559424 | 1MS001B MMD 5YR EQ Overhaul | 03/27/2006 |
| | | 559482 | 1SI8801 Motor Operated Valve Diagnostic Test | 07/24/2004 |
| | | 559523 | 1RH8716A SRV for Age Related Degrd | 03/16/2004 |

| Inspection Procedure | Type | Designation | Description or Title | Revision or Date |
|----------------------|------|-------------|---|------------------|
| | | 631306 | Fab and Install Valve Assembly | 03/17/2011 |
| | | 743303 | 1CC685 Tech Spec Therm O.L. Surv 1AP28E MCC 132X4, Cub D4 | 01 |
| | | 900411 | 1CC685 SRV for Age Rltd Degradation | 01 |
| | | 918421 | 1SX007 Motor Oprtd VLV Diag Test | 01 |
| | | 958396 | Rebuild Actuator, Replace Elastomers and Solenoid Check Valves | 11/28/2007 |
| | | 970005436 | 1RH8716A Motor Oprtd Valve Diag Test | 04/15/1997 |
| | | 98100280 | 1RH8716A Motor Oprtd Vlv Diag Test | 05/07/2004 |