

Exelon Generation Company, LLC      www.exeloncorp.com  
Braidwood Station  
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Braidwood, IL 60407

10 CFR 50.73

August 24, 2009  
BW090080

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

Braidwood Station, Unit 1  
Facility Operating License No. NPF-72  
NRC Docket No. STN 50-456

Subject: Licensee Event Report 2009-002-00 – Safety Injection System Containment Sump Isolation Valve 1SI8811B Failed to Stroke Full Open Due to Torque Switch Assembly Corrosion

The enclosed Licensee Event Report (LER) is being submitted in accordance with 10 CFR 50.73, "Licensee event report system," paragraph (a)(2)(i)(B) as a condition prohibited by the plant's Technical Specifications (TS), and paragraph (a)(2)(v)(B) as a condition that prevented the fulfillment of a system's safety function. On June 24, 2009, safety injection system containment sump isolation valve 1SI8811B failed to stroke full open during surveillance testing due to corrosion of the valve's torque switch assembly. 10 CFR 50.73(a) requires an LER to be submitted within 60 days following discovery of the event. Therefore, this report is being submitted by August 24, 2009.

There are no regulatory commitments contained in this letter. Should you have any questions concerning this submittal, please contact Mr. David Gullott, Regulatory Assurance Manager, at (815) 417-2800.

Respectfully,



Amir Shahkarami  
Site Vice President  
Braidwood Station

Enclosure: LER 2009-002-00

**LICENSEE EVENT REPORT (LER)**

(See reverse for required number of digits/characters for each block)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

<b>1. FACILITY NAME</b> Braidwood Station, Unit 1	<b>2. DOCKET NUMBER</b> 05000456	<b>3. PAGE</b> 1 OF 4
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**4. TITLE**  
Safety Injection System Containment Sump Isolation Valve 1SI8811B Failed to Stroke Full Open Due to Torque Switch Assembly Corrosion

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
06	24	2009	2009	002	00	08	24	2009	N/A	N/A
									N/A	N/A

**9. OPERATING MODE**  
1

**10. POWER LEVEL**  
100

**11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §:** (Check all that apply)

<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)
<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)
<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input checked="" type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER
<input type="checkbox"/> 20.2203(a)(2)(vi)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

**12. LICENSEE CONTACT FOR THIS LER**

FACILITY NAME David Gullott, Regulatory Assurance Manager	TELEPHONE NUMBER (Include Area Code) (815) 417-2800
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**13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT**

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
B	BP	Torque Switch	L200	Yes	N/A	N/A	N/A	N/A	N/A

**14. SUPPLEMENTAL REPORT EXPECTED**  
 YES (If yes, complete 15. EXPECTED SUBMISSION DATE)  NO

**15. EXPECTED SUBMISSION DATE**

MONTH	DAY	YEAR
01	31	10

**ABSTRACT** (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On June 24, 2009, Safety Injection system containment sump isolation valve 1SI8811B was stroked open for surveillance testing. The 1SI8811B control board indication went dual, but never indicated full open. Locally 1SI8811B was observed approximately 30 to 40 percent open. Investigation found water in the actuator limit switch (LS) compartment, and it was determined the actuator torque switch (TS) for the 1SI8811B was corroded and non functional. The cause of the corrosion was determined to be water intrusion into the LS compartment through the conduit. The TS and LS finger bases were replaced. On June 26, 2009 at 02:42 hours, the valve was restored to operable status.

Corrective actions (CA) include replacing the TS and LS finger bases, and cleaning and drying the wires and LS compartment on 1SI8811B. Additional CA planned include sealing of the 1SI8811B conduit, a walkdown of all the auxiliary building high and medium risk motor operated valves to determine if similar conduit openings exist that would allow water intrusion, and sealing of these conduits.

There were no actual safety consequences impacting plant or public safety as a result of this event. This event is being reported pursuant to 10 CFR 50.73(a)(2)(i)(B) and 10 CFR 50.73(a)(2)(v)(B). Failure of 1SI8811B to fully open prevented 1SI8804B, Residual Heat Removal to Safety Injection, and 1CS009B Containment Spray Pump 1B Sump Suction Valve from opening.



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**NARRATIVE**

conduit houses the control power cables and is routed from the electrical component compartment of 1SI8811B up to a cable tray where it terminates, open-ended at approximately a 45 degree angle, above the edge of an open cable tray (Cable Tray 1619G). A second cable tray (Cable Tray 1619F), is routed directly above Cable Tray 1619G. The configuration of the conduit is such that if water was spilled/sprayed on top of the upper cable tray, any runoff would be routed toward the opening of the conduit, providing a direct path to the electrical component compartment of the operator for 1SI8811B. The conduit openings into the LS enclosures for MOVs are not required to be sealed per Environmental Qualification (EQ) Binder number EQ-BB-027.

In an effort to determine the source of the water found in the LS compartment, a sample of water was taken and analyzed by Chemistry. An isotopic analysis was performed. Water was not from the reactor coolant system. Evaluation of potential non-contaminated water sources (containment penetrations) above the 1SI8811B valve include systems Chilled Water (WO), Essential Service Water (SX), Make-up Water (WM) and spare penetrations used for steam generator sludge lancing (WM water). Investigation could not determine the exact source of the water found in the LS enclosure.

Based on the above analysis, the cause of this event was determined to be corrosion of the TS assembly, causing it to become non-functional, due to water intrusion into the LS compartment through the conduit.

**D. Safety Consequences:**

There were no safety consequences impacting the plant or public safety as a result of this event. The 1SI8811B valve is closed during normal operations, and the issue was discovered during a planned valve stroke test of the 1SI8811B valve in accordance with Operating surveillances as required by Technical Specifications.

An evaluation was performed to determine past operability and whether the valve could pass design flow at the as-found opening travel position for the valve. Based on the failure mode, the valve would have been capable of opening to the bypass LS setting of approximately 38 percent open, and the valve was capable of passing the required ECCS recirculation flow at this partial opening position. Additional consequences of the inability of 1SI8811B to achieve full open valve travel are the failure to meet the electrical interlock to manually open valve 1SI8804B, Residual Heat Removal (RH) to Safety Injection (SI) crosstie valve, and 1CS009B Containment Spray (CS) Pump 1B Sump Suction valve from the main control room. The 1SI8804B is required to open in order to establish flow from the ECCS sump to the Hi/Intermediate Head ECCS pumps during the cold leg recirculation phase of ECCS. The 1CS009B is required to open in order to establish flow to the CS system from the containment recirculation sump.

The SI containment sump is required for loss of coolant accidents (LOCA) inside containment during the recirculation phase of the accident. Additionally, rupture of a control rod drive mechanism causing a rod cluster control assembly ejection accident results in a loss of reactor coolant inventory which the SI system would be required to mitigate the accident. The SI containment sump isolation valves receive a signal to open when an SI signal is actuated and the refueling water storage tank (RWST) reaches the RWST Low-2 setpoint. The CS system is required for a LOCA to minimize containment pressure and will also actuate during a feedwater or steam line break inside containment.

This event resulted in a safety system functional failure due to loss of interlock function of 1SI8811B. The 1SI8811B is required to be fully open to make up electrical interlocks that allow opening of 1SI8804B and 1CS009B. The periods of time when the redundant train of RH and CS were unavailable result in a loss of safety function. The CS and ECCS systems would not be able to be realigned to take suction from the containment recirculation sump.

An evaluation is being performed to determine the bounding impact on the SI system, the plant's ability to mitigate events, and the associated change in risk. A supplement to this report will be provided with the conclusions of this evaluation and the associated risk impact.

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**NARRATIVE**

**E. Corrective Actions:**

Corrective actions taken include replacing the torque switch and limit switch finger bases, cleaning and drying the wires and limit switch compartment /enclosure on 1SI8811B, and diagnostic testing. (Actions completed)

Additional corrective actions include:

- Sealing the 1(2)SI8811B conduits
- A walkdown of all the auxiliary building high and medium risk MOVs will be performed to determine if conduit openings exist similar to 1SI8811B that would allow water intrusion from above.
- Sealing of the identified conduits.

**F. Previous Occurrences:**

There have been no similar Licensee Event Report events at Braidwood Station in the last three years.

**G. Component Failure Data:**

<u>Manufacturer</u>	<u>Nomenclature</u>	<u>Model</u>	<u>Mfg. Part Number</u>
Limitorque Corporation	Motor Operator Valve Actuator	SMB-2	N/A