



# Exelon Generation®

Exelon Generation Company, LLC      [www.exeloncorp.com](http://www.exeloncorp.com)  
Braidwood Station  
35100 South Route 53, Suite 84  
Braceville, IL 60407-9619

10 CFR 50.73

August 24, 2015  
BW150079

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

Braidwood Station, Unit 2  
Facility Operating License No. NPF-77  
NRC Docket No. STN 50-457

Subject: Licensee Event Report 2015-003-00 – Degraded Valve Causes Loss of Diesel Fuel Oil System Volume for One Train of the Diesel Generator System Resulting in Inoperability Longer than Allowed by Technical Specifications

The enclosed Licensee Event Report (LER) is being submitted in accordance with 10 CFR 50.73, "Licensee Event Report System."

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

Respectfully,

Mark Kanavos  
Site Vice President  
Braidwood Station

Enclosure: LER 2015-003-00

cc: NRR Project Manager – Braidwood Station  
Illinois Emergency Management Agency – Division of Nuclear Safety  
US NRC Regional Administrator, Region III  
US NRC Senior Resident Inspector (Braidwood Station)  
Illinois Emergency Management Agency - Braidwood Representative

<b>NRC FORM 366</b> (02-2014)		<b>U.S. NUCLEAR REGULATORY COMMISSION</b>		APPROVED BY OMB: NO. 3150-0104		EXPIRES: 1/31/2017																																					
<h2 style="margin: 0;">LICENSEE EVENT REPORT (LER)</h2>																																											
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<b>4. TITLE</b> Degraded Valve Causes Loss of Diesel Fuel Oil System Volume for One Train of the Diesel Generator System Resulting in Inoperability Longer than Allowed by Technical Specifications																																											
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<b>9. OPERATING MODE</b> <div style="text-align: center; font-size: 24px; margin-top: 10px;">1</div>		<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)</b> <table style="width:100%; margin-top: 10px;"> <tr> <td><input type="checkbox"/> 20.2201(b)</td> <td><input type="checkbox"/> 20.2203(a)(3)(i)</td> <td><input type="checkbox"/> 50.73(a)(2)(i)(C)</td> <td><input type="checkbox"/> 50.73(a)(2)(vii)</td> </tr> <tr> <td><input type="checkbox"/> 20.2201(d)</td> <td><input type="checkbox"/> 20.2203(a)(3)(ii)</td> <td><input type="checkbox"/> 50.73(a)(2)(ii)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(viii)(A)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(1)</td> <td><input type="checkbox"/> 20.2203(a)(4)</td> <td><input type="checkbox"/> 50.73(a)(2)(ii)(B)</td> <td><input type="checkbox"/> 50.73(a)(2)(viii)(B)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(i)</td> <td><input type="checkbox"/> 50.36(c)(1)(i)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(iii)</td> <td><input type="checkbox"/> 50.73(a)(2)(ix)(A)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(ii)</td> <td><input type="checkbox"/> 50.36(c)(1)(ii)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(iv)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(x)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(iii)</td> <td><input type="checkbox"/> 50.36(c)(2)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(A)</td> <td><input type="checkbox"/> 73.71(a)(4)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(iv)</td> <td><input type="checkbox"/> 50.46(a)(3)(ii)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(B)</td> <td><input type="checkbox"/> 73.71(a)(5)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(v)</td> <td><input type="checkbox"/> 50.73(a)(2)(i)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(C)</td> <td><input type="checkbox"/> OTHER</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(vi)</td> <td><input checked="" type="checkbox"/> 50.73(a)(2)(i)(B)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(D)</td> <td style="text-align: right; font-size: 10px;">Specify in Abstract below or in NRC Form 366A</td> </tr> </table>						<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 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
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<b>LICENSEE CONTACT</b> Phillip J. Raush, Regulatory Assurance Manager						<b>TELEPHONE NUMBER</b> (815) 417-2800																																					
<b>13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT</b>																																											
CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX																																		
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<b>14. SUPPLEMENTAL REPORT EXPECTED</b> <input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO						<b>15. EXPECTED SUBMISSION DATE</b> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th style="width:33%;">MONTH</th> <th style="width:33%;">DAY</th> <th style="width:33%;">YEAR</th> </tr> <tr> <td style="text-align: center;">N/A</td> <td style="text-align: center;">N/A</td> <td style="text-align: center;">N/A</td> </tr> </table>			MONTH	DAY	YEAR	N/A	N/A	N/A																													
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<b>ABSTRACT</b>  <p>On June 24, 2015, during the 2B emergency diesel generator (DG) monthly surveillance run, the redundant 2A diesel oil storage tank (DOST) fuel oil level increased. This DOST level change was caused by leak by of the 2A DOST fill valve (2DO001A). Engineering evaluated the 2B DG fuel oil volume with consideration for the 2DO001A leak by and determined that the 2B EDG did not have sufficient fuel oil to satisfy its 7 day mission time specified in Technical Specification (TS) 3.8.3 "Diesel Fuel Oil".</p> <p>This event is reportable in accordance with 10 CFR 50.73(a)(2)(i)(B), for "any operation or condition which was prohibited by the plant's Technical Specifications" since the 2B DG was not declared inoperable and some associated Limiting Condition For Operation Action Requirements (LOCAR) were not completed.</p> <p>The cause of the event was a degraded DOST fill valve that allowed fuel oil to transfer from the 2B DOST to the 2A DOST during 2B DG operation.</p> <p>Corrective actions include repairing of 2DO001A and implementing a DOST fill valve leakage monitoring program with associated acceptance criteria, or implementing a plant configuration change to install an additional valve in the flow path.</p>																																											

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## NARRATIVE

**A. Plant Operating Conditions Before the Event:**

Event Date: June 24, 2015

Unit: 2 Mode: 1 Reactor Power: 100 percent

Unit 2 Reactor Coolant System [AB]: Normal operating temperature and pressure.

No structures, systems or components were inoperable at the start of this event that contributed to the event.

**B. Description of Event:**

On June 24, 2015, during the 2B DG monthly surveillance run, it was observed that the redundant 2A DOST fuel oil level increased from 98.0% to 98.5% during the 5.25 hour run. The DOST level change was caused by leak by of the 2A DOST fill valve (2DO001A) which was last manipulated 13 days prior on June 11, 2015 to refill the 2A DOST. Engineering evaluated the 2B DG fuel oil volume with consideration for the 2DO001A leak by and determined that the 2B DG fuel oil volume was insufficient to satisfy the 7 day mission time specified in Technical Specifications (TS) 3.8.3, "Diesel Fuel Oil". Operations isolated the leaking 2A DOST fill valve by closing 2DO2055B on June 24, 2015. Consequently, the 2B DG was inoperable for 13 days between June 11, 2015 (when the 2DO001A was manipulated) and June 24, 2015 (when the redundant DO valve was closed isolating the degraded 2DO001A fill valve).

During DG operation, the motor driven fuel oil transfer pumps deliver fuel from the DOST to the DG day tank. An engine-driven fuel oil pump delivers fuel from the day tank to the DG. Excess fuel from the day tank over flows back to the DOST. The DOSTs are filled from outside tanks using a 4-inch fill header and local fill valves 2DO001A and 2DO001B located at the top of each DOST. This 4-inch fill header is used to fill the Unit 2 Diesel Driven Auxiliary Feedwater (DDAF) day tank through valves 2DO2057 and 2DO2058. A piping connection is provided for each set of transfer pumps to recirculate back to the DOST without going through the DG day tanks. This recirculation path contains valves 2DO2055A (2A DG transfer pumps) and 2DO2055B (2B DG transfer pumps).

Braidwood TS 3.8.3, "Diesel Fuel Oil," Condition A requires each DOST to have a storage volume greater than or equal to 44,000 gallons. TS Bases B 3.8.3 states that the stored diesel fuel oil is required to have sufficient supply for seven days of post-accident load operation. Although the station was in compliance with TS 3.8.3, Condition A (diesel fuel oil volume never dropped below 44,000 gallons), when it was determined the 2B DG could not meet its required mission time, the DG was inoperable in accordance with TS 3.8.3, Condition D, "One or more DGs with diesel fuel oil not within limits for reasons other than Condition A, B, or C." Condition D requires the associated DG to be declared inoperable immediately. TS 3.8.1, "AC Sources — Operating", Condition B "One required DG inoperable" has a 14 day allowed outage time with several required actions. Although the 14 day allowed outage time (Condition B.5) was not exceeded, the following TS 3.8.1 required actions were not completed:

- B.1 - Verify both opposite-unit DGs are operable within 1 hour and once per 24 hours thereafter
- B.2 – Perform SR 3.8.1.1 for the required qualified circuits within 1 hour and once per 8 hours thereafter
- B.4.1 – Determine Operable DG is not inoperable due to common cause failure within 24 hours OR
- B.4.2 - Perform SR 3.8.1.2 for operable DG within 24 hours

This condition is reportable in accordance with 10 CFR 50.73(a)(2)(i)(B) for an operation or condition prohibited by Technical Specifications.

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**Event Timeline:**

4/23/15 – The DO valve lineup is changed per an engineering change made for FLEX changing the normal position of 2DO2055B from closed to the open position.

4/29/2015 – During the 2B DG monthly run, the 2A DOST level increased by 0.25%. Operations responded by tightening the 2A DOST fill valve, 2DO001A. At this time, Engineering determined that the 2B DG had adequate fuel oil available to support its 7 day mission time.

5/27/2015 – During the 2B DG monthly run, the 2A DOST level did not change; an indication of no leak by on valve 2DO001A.

6/10-11/2015 – The 2A DOST fill valve 2DO001A is cycled to refill the 2A DOST during the 2A DG 24 hour surveillance run. The manipulation of this valve is considered the time when the excessive leakage initiated.

6/24/2015 – During the 2B DG monthly surveillance run of 5.25 hours, the 2A DOST level increases by 0.5%. Attempts to tighten down on 2DO001A were not successful. On the same day, 2DO2055B is closed.

6/25/2015 – Engineering notified Operations that based on the leakage observed past valve 2DO001A on 6/24/2015, the 2B DG would not have sufficient fuel for the 7 day requirement per TS Bases 3.8.3.

**C. Cause of Event**

The cause of the reduction in the 2B DG fuel oil supply is due to leakage past the 2A DOST fill valve, 2DO001A.

**D. Safety Significance**

Stored diesel fuel oil is required to have sufficient supply for 7 days of post-accident load operation. It is also required to meet specific standards for quality. This requirement, in conjunction with an ability to obtain replacement supplies within 7 days, supports the availability of DGs required to shut down the reactor and to maintain it in a safe condition for an Anticipated Operational Occurrence (AOO) or a postulated DBA with loss of offsite power.

This event is not considered an event or condition that could have prevented fulfillment of a safety function because the redundant train equipment which includes the 2A DG were available during the affected time period. In addition, the 2B auxiliary feedwater (AF) day tank level and 2B AF system operability were unaffected by this event.

The results of the probabilistic risk analysis (PRA) review of this event indicate that the 2B DG was available based on the large volume of fuel oil still available (2 additional outdoor diesel fuel oil tanks), even though it would have been inoperable in accordance with TS 3.8.3, Condition D. The 2A DG was operable and redundant 2A engineered safety feature equipment were available at all times.

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U.S. NUCLEAR REGULATORY COMMISSION

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**D. Corrective Actions:**

The leaking DOST fill valve, 2DO001A, was isolated by closing the 2B diesel oil transfer pump return valve, 2DO2055B, on 6/24/2015. The equivalent Unit 1 DOST fill valves were also isolated by closing 1B diesel fuel oil transfer pump return valve, 1DO2055B, on August 23, 2015. An apparent cause evaluation was performed. Corrective actions include:

- Repair 2A DOST fill valve, 2DO001A
- Implement DOST fill valve (1/2DO001A) leakage monitoring program with associated acceptance criteria or implement a plant configuration change to install an additional valve in the flow path

**E. Previous Occurrences:**

No previous occurrences of this issue were found at Braidwood Station in the past 3 years.

A similar occurrence was found at Byron Station (reference Licensee Event Report (LER) 454-2015-003-00, "Byron Unit 1, One Train of the Diesel Generator System Inoperable Longer than Allowed by Technical Specifications Due to Loss of Diesel Fuel Oil System Volume", dated 7/27/2015)

**F. Component Failure Data:**

<u>Manufacturer</u>	<u>Nomenclature</u>	<u>Model</u>	<u>Mfg. Part Number</u>
Anchor Darling	2A DOST fill valve	4" 150 lb. Gate	E-6220-2-204