



Exelon Generation®

May 1, 2015

Byron Generating Station

4450 North German Church Rd  
Byron, IL 61010-9794

[www.exeloncorp.com](http://www.exeloncorp.com)

LTR: BYRON 2015-0050  
File: 1.10.0101 (1D.101)  
2.07.0100 (5A.108)

United States Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555-0001

Byron Station, Unit 1  
Facility Operating License No. NPF-37  
NRC Docket No. STN 50-454

Subject: Licensee Event Report (LER) 454-2015-002-00, "Byron Unit 1, Reactor Trip Resulting from a Phase to Phase Fault on the 1E Main Power Transformer"

Enclosed is Byron Station Licensee Event Report (LER) No. 454-2015-002-00 regarding the Byron Unit 1 Reactor Trip, caused by a falling ice formation that resulted in a phase to phase fault on the 1E Main Power Transformer. This condition is reportable in accordance with 10 CFR 50.73(a)(2)(iv)(A) for any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph (a)(2)(iv)(B) of section 10 CFR 50.73 (a)(2)(iv).

There are no regulatory commitments in this report.

Should you have any questions concerning this submittal, please contact Mr. Douglas Spitzer, Regulatory Assurance Manager, at (815) 406-2800.

Respectfully,

Faber A. Kearney  
Site Vice President  
Byron Generating Station

FAK/GC/sg

Enclosure: LER 454-2015-002-00

cc: Regional Administrator – NRC Region III  
NRC Senior Resident Inspector – Byron Generating Station



**LICENSEE EVENT REPORT (LER)**

(See Page 2 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 FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@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> Byron Station, Unit 1	<b>2. DOCKET NUMBER</b> 05000454	<b>3. PAGE</b> 1 OF 3
--	-------------------------------------	--------------------------

**4. TITLE**  
Byron Unit 1 Reactor Trip Resulting from a Phase to Phase Fault on the 1E Main Power Transformer

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
03	03	2015	2015	002	00	05	01	2015	N/A	N/A
									FACILITY NAME	DOCKET NUMBER
									N/A	N/A

<b>9. OPERATING MODE</b>	<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)</b>			
1	<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)
10. POWER LEVEL  100	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input checked="" 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 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**

LICENSEE CONTACT Douglas Spitzer – Manager, Byron Regulatory Assurance	TELEPHONE NUMBER (Include Area Code) (815) 406-2800
---	--

**13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT**

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
B	EL	XFMR	W120	Y	N/A	N/A	N/A	N/A	N/A

<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>	MONTH	DAY	YEAR

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

At 1101 hours on March 3, 2015, Byron Station Unit 1 tripped from full power due to a phase to phase fault on the 1E Main Power Transformer (MPT) between electrical Phase A and Phase B. Before this trip, the Byron area had experienced severe weather. At the time of the event, the temperature was approximately 30 degrees F; however, temperatures had been around 23 degrees F hours earlier. An ice formation on the Phase B Bus bar that is located directly above the high voltage bushings dropped and caused a phase to phase fault between Phase A and B.

This event is reportable in accordance with 10 CFR 50.73(a)(2)(iv)(A) for any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph 10 CFR 50.73(a)(2)(iv)(B).

The cause of this event was due to latent design vulnerability that existed in the configuration of the Bus bar relative to the MPT bushings. The Bus bar location directly above and parallel to the MPT bushings created a condition that resulted in a phase to phase short when ice from the Bus bar fell across the bushings. The Bus bar is six inches in diameter and located approximately twenty-three feet above the top of the bushings. The 1E MPT high voltage and neutral bushings were replaced during the forced outage. Following successful testing of the 1E MPT, Byron Unit 1 was restarted.



**LICENSEE EVENT REPORT (LER)  
CONTINUATION SHEET**

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 FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@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.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REV NO.	
Byron Station, Unit 1	05000454	2015	- 002	- 00	2 OF 3

**NARRATIVE**

**A. Plant Condition Prior to Event**

Event Date/Time: March 3, 2015 / 1101 hours CST  
Unit 1 - Mode 1 - Power 100 percent

Reactor Coolant System [AB]: Normal operating temperature and pressure. There was no inoperable equipment that contributed to this event.

**B. Description of Event**

At 1101 hours on March 3, 2015, Byron Station Unit 1 tripped from full power due to a phase to phase fault on the 1E Main Power Transformer (MPT) between electrical Phase A and Phase B. Before this trip, the Byron area had experienced severe weather. At the time of the event, the temperature was approximately 30 degrees F; however, temperatures had been around 23 degrees F hours earlier. An ice formation on the Phase B Bus bar that is located directly above the high voltage bushings dropped and caused a phase to phase fault between Phase A and B. No equipment malfunctions existed that complicated the post reactor trip response and all plant systems responded to the event as designed.

The 1E MPT protective relays actuated to trip the transformer as designed. Following the trip, an inspection of the associated MPT revealed that the top of the Phase A bushing was charred and the top of the Phase B bushing was charred with two holes in it. Additionally, a portion of the corona ring for both Phase A and B had melted. An approximate five foot section of ice was found on the ground below.

This event is reportable in accordance with 10 CFR 50.73(a)(2)(iv)(A) for any event or condition that resulted in manual or automatic actuation of any of the systems listed in paragraph 10 CFR 50.73(a)(2)(iv)(B).

**C. Cause of Event**

The cause of this event was due to latent design vulnerability that existed in the configuration of the Bus bar relative to the MPT bushings. The Bus bar location directly above and parallel to the MPT bushings created a condition that resulted in a phase to phase short when ice from the Bus bar fell across the bushings. The Bus bar is six inches in diameter and located approximately twenty-three feet above the top of the bushings.

**D. Safety Significance**

This event is not considered an event or condition that could have prevented fulfillment of a safety function. The results of the risk assessment of this event indicate that the Unit 1 trip was not a risk significant event. The equipment operated as designed to take the plant to a safe condition.

At the time of 1E MPT phase to phase trip, Unit 1 and Unit 2 online risk was green. All of the mitigating systems responsible for responding to an accident scenario were available to perform their function. All of the fission product barriers (cladding, reactor coolant system, containment) were in no danger of compromise throughout the event. In addition, the event was within the assumptions of the probabilistic risk assessment (PRA) model, with no anomalous PRA equipment occurrences affecting core damage

**LICENSEE EVENT REPORT (LER)  
CONTINUATION SHEET**

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
Byron Station, Unit 1	05000454	YEAR	SEQUENTIAL NUMBER	REV NO.	3 OF 3
		2015	- 002	- 00	

**NARRATIVE**

frequency. No Emergency Action Level threshold in accordance with the Emergency Plan was met and no emergency classification was declared during the event.

**E. Corrective Actions**

The 1E MPT high voltage and neutral bushings were replaced during the forced outage. Following successful testing of the 1E MPT, Byron Unit 1 was restarted.

The corrective action to prevent recurrence is to implement a design solution to eliminate the vulnerability associated with the Bus bar being located directly above the MPT high voltage bushings and reduce the potential for a phase to phase fault from an ice fall.

Extent of Condition – All of the large outside transformers at Byron Station were reviewed and only the MPTs on both units have a vulnerability to a phase to phase fault due to ice falling from the Bus bar. The extent of condition associated with ice falling with the potential to cause a unit trip or derate is limited to the MPTs and select switchyard equipment.

**F. Previous Occurrences**

Byron Station Unit 1, February 17, 1986 at 0809 hours (LER 454-86-008-00). A reactor trip occurred due to a Phase A to Phase B fault on Bus 4 in the switchyard due to ice falling from a transmission line tower that caused Unit 1 to trip. Historical weather data was obtained that indicates the temperature was approximately 30 degrees F at the time of the event. A potential transformer was damaged in the switchyard and replacement was required to restore operation.