



Exelon Generation®

Clinton Power Station  
8401 Power Road  
Clinton, IL 61727

U-604287  
May 31, 2016

10CFR50.73  
SRRS 5A.108

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

Clinton Power Station, Unit 1  
Facility Operating License No. NPF-62  
NRC Docket No. 50-461

Subject: Licensee Event Report 2016-005-00

Enclosed is Licensee Event Report (LER) 2016-005-00: Insulator Failure on the Reserve Auxiliary Transformer Results in a Loss of Secondary Containment Vacuum. This report is being submitted in accordance with the requirements of 10 CFR 50.73.

There are no regulatory commitments contained in this report.

Should you have any questions concerning this report, please contact Mr. Dale Shelton, Regulatory Assurance Manager, at (217) 937-2800.

Respectfully,

Theodore R. Stoner  
Site Vice President  
Clinton Power Station

KP/cac

Attachment: Licensee Event Report 2016-005-00

cc:

Regional Administrator— NRC Region III  
NRC Senior Resident Inspector - Clinton Power Station  
Office of Nuclear Facility Safety — Illinois Emergency Management Agency

IEZZ  
NRR



## 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 [Infocollections.Resource@nrc.gov](mailto:Infocollections.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:

Clinton Power Station, Unit 1

## 2. DOCKET NUMBER

05000461

## 3. PAGE

1 OF 4

## 4. TITLE

Insulator Failure On the Reserve Auxiliary Transformer Results In A Loss of Secondary Containment Vacuum

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
04	02	2016	2016	005	00	05	31	2016	FACILITY NAME	05000
									FACILITY NAME	DOCKET NUMBER
										05000

  

9. OPERATING MODE	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)			
1	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
10. POWER LEVEL	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
	<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)(C)	<input type="checkbox"/> 73.77(a)(1)
	<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)(D)	<input type="checkbox"/> 73.77(a)(2)(i)
	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 73.77(a)(2)(ii)
	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> OTHER	Specify in Abstract below or in NRC Form 366A	

## 12. LICENSEE CONTACT FOR THIS LER

LICENSEE CONTACT

Dale A. Shelton, Regulatory Assurance Manager

TELEPHONE NUMBER (Include Area Code)

217-937-2800

## 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	EB	Insulator	Ohio Brass	Y					

## 14. SUPPLEMENTAL REPORT EXPECTED

☐ YES (If yes, complete 15. EXPECTED SUBMISSION DATE) ☒ NO

## 15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

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

On April 2, 2016, at approximately 1257 CDT the Main Control Room (MCR) received numerous annunciators that indicated a trip of the Reserve Auxiliary Transformer (RAT) and associated Static VAR Compensator (SVC). The MCR entered Technical Specification (TS) Limiting Condition for Operation (LCO) 3.8.1, AC Sources-Operating, Required Actions A.1 and A.2. The Division 1 Fuel Building ventilation (VF) system isolation dampers closed due to loss of power causing a trip of VF supply and exhaust fans. With the VF fans inoperable, Secondary Containment (SC) vacuum rose to slightly greater than 0 inches water gauge (WG) which exceeded the TS requirement of greater than 0.25 inches vacuum WG. The MCR entered Emergency Operating Procedure (EOP)-8, Secondary Containment Control, and TS LCO 3.6.4.1, Secondary Containment, Required Action A.1. SC vacuum was restored within TS requirements at 1300 by starting the Standby Gas Treatment (VG) system. The RAT was successfully returned to service following replacement of the broken 'A' phase insulator stack on the 345 kV Circuit Switcher 4538. The cause of this event was identified as the failure of the 'A' phase 4538, 345 kV Circuit Switcher insulator due to a manufacturing defect. The corrective actions included performing a risk review of all Ohio Brass Insulators for potential failure impact and creating a replacement strategy to replace the high risk and critical insulators. Replacement of the remaining Ohio Brass insulators in the switchyard will be completed by the end of C1R17.

**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](mailto: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.

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**NARRATIVE****PLANT AND SYSTEM IDENTIFICATION**

General Electric—Boiling Water Reactor, 3473 Megawatts Thermal Rated Core Power  
Energy Industry Identification System (EIIIS) codes are identified in the text as [XX]

**EVENT IDENTIFICATION**

Insulator Failure on the Reserve Auxiliary Transformer Results in a Loss of Secondary Containment Vacuum

**A. Plant Operating Conditions before the Event**

Unit: 1	Event Date: 04/02/16	Event Time: 1257
Mode: 1	Mode Name: Power Operation	Reactor Power: 99 percent

**B. DESCRIPTION OF EVENT**

On April 2, 2016, at approximately 1257 CDT the Reserve Auxiliary Transformer (RAT) and Static VAR Compensator (SVC) tripped due a failure of the 'A' phase insulator 345 kV Circuit Switcher 4538 in the switchyard. The Main Control Room (MCR) entered Technical Specification (TS) Limiting Condition for Operation (LCO) 3.8.1, AC Sources-Operating, Required Action A.1 and A.2. The CPS area was experiencing very strong winds at the time of the failure. The bus bar connected to the failed insulator has a configuration that is susceptible to wind induced loads. The bus bar is supported at the plant north end by the insulator stack and on the south end by a flexible link attached to the 345 kV Circuit Switcher 4538. In the middle of the bus bar is a wire connection to the overhead 345 kV lines that supply power from the North Bus. This configuration allows the wind to induce loads on the overhead 345 kV lines, the electrical drop connection (wire attached to the bus bar), and on the physical bus bar itself.

As a result of the voltage transient, caused by automatic transfer to the Emergency Reserve Auxiliary Transformer (ERAT), the Division 1 Fuel Building Ventilation (VF) system isolation dampers closed causing a trip of VF supply and exhaust fans. The effect of this condition was that Secondary Containment (SC) rose to slightly greater than 0 inches water gauge (WG) and exceeded the TS limit of 0.25 inch water gauge. Operations personnel entered Emergency Operating Procedure (EOP) -8, Secondary Containment Control, and TS LCO 3.6.4.1, Secondary Containment, Required Action A.1. The Standby Gas Treatment System was started and SC vacuum was restored within TS limits at 1300 hours.

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## NARRATIVE

Additional actuations occurred resulting from the RAT trip. MCR intake radiation monitors 1RIX-PR001A/C and 8A/C had momentary power interruptions and were temporarily inoperable. The MCR ventilation (VC) Division 2 auto transferred to high radiation mode. Division 1 diesel generator (DG) Vent Oil Room exhaust fan tripped and was restarted. Subsequent review concluded that these systems responded as expected due to the momentary loss of power and did not adversely affect the safe operation of the plant or the restoration of SC.

The RAT was successfully returned to service following replacement of the broken 345 kV Circuit Switcher 4538 insulator stack ('A' phase). The 'B' phase was also replaced (the 'C' phase had been previously replaced due to an identified crack). Alignment testing was performed on the 4538 Circuit Switcher as well as thermography and a visual inspection of the high voltage cable connections.

## C. CAUSE OF EVENT

The cause of the event was identified as the failure of the 'A' phase 345 kV 4538 Circuit Switcher insulator due to a manufacturing defect. The CPS area was experiencing very strong winds at the time of the insulator failure.

## D. SAFETY ANALYSIS

This event is reportable in accordance with 10 CFR 50.73(a)(2)(v)(C) as a condition that could have prevented fulfillment of a safety function to control the release of radioactive material because SC was declared inoperable.

The defective insulator caused a trip of the RAT which is a condition bounded by the analysis in Updated Safety Analysis Report section 15.2.6, "Loss of AC Power." The condition described in this report is less severe and involved no safety consequences. The AC electrical power sources are designed with sufficient redundancy to ensure the availability of necessary power to plant systems, structures, and components.

The VG system was fully operable at the time of the event and capable of performing its required safety function. Operations entered EOP-8 for SC vacuum less than minus 0.25 inch WG and entered TS LCO 3.6.4.1 Required Action A.1. SC vacuum was restored to within TS limits within the completion time requirement. The SC vacuum is kept slightly negative relative to atmospheric pressure to prevent leakage to the atmosphere. The VF system is a non-safety ventilation system which is normally in service to maintain secondary containment vacuum. The VG system is the safety-related system which is relied upon to perform this function following an accident. During the event the VG system was placed in service and restored SC to operability consistent with its safety function. Therefore, the ability of the station to maintain SC vacuum in the event of an accident was never jeopardized or challenged by the VF system fan trip. Engineering analysis has determined that this event is not considered a safety system functional failure.

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**NARRATIVE**

**E. CORRECTIVE ACTIONS**

CPS performed an analysis of remaining installed Ohio Brass insulators. A total of 196 Ohio Brass insulator stacks were identified as installed on site in the switchyard. An Operational Decision Making (ODM) process was performed and developed a replacement strategy. All Ohio Brass insulators were risk reviewed for the potential failure impact and a replacement strategy was created to replace the high risk and critical insulators. Replacement of all remaining Ohio Brass insulators in the CPS switchyard will be completed by the end of C1R17.

**F. PREVIOUS SIMILAR OCCURENCES**

No previous events were identified associated with an insulator failure.

**G. COMPONENT FAILURE DATA**

The component failure associated with this event was the defective Ohio Brass insulator.

Component Failure Data:

Part: Insulator

Manufacturer: Ohio Brass