



An Exelon Company

Clinton Power Station
R. R. 3, Box 228
Clinton, IL 61727

10 CFR 50.73
SRRS 5A.108

U-603771
May 17, 2006

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 2006-001-00

Enclosed is Licensee Event Report (LER) No. 2006-001-00: Failure to Tighten Terminal Screw Causes Turbine/Generator Trip and Reactor Scram. This report is being submitted in accordance with the requirements of 10CFR50.73.

Should you have any questions concerning this report, please contact Mr. Ronald Frantz, Sr. Regulatory Specialist, at (217)-937-2813.

Respectfully,

A handwritten signature in black ink, appearing to read "B. Hanson", with a long horizontal flourish extending to the right.

Bryan Hanson
Site Vice President
Clinton Power Station

RSF/blf

Enclosures: Licensee Event Report 2006-001-00
Summary of Commitments

cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Clinton Power Station
Office of Nuclear Facility Safety – IEMA Division of Nuclear Safety

IE22

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: 50 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 infocollect@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	2. DOCKET NUMBER 05000 461	3. PAGE 1 OF 3
--------------------------------------------------	--------------------------------------	--------------------------

4. TITLE
Failure to Tighten Terminal Screw Causes Turbine/Generator Trip and Reactor Scram

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	20	2006	2006	- 001 -	00	05	17	2006	None	05000
									FACILITY NAME	DOCKET NUMBER
									None	05000

9. OPERATING MODE 1	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)						
10. POWER LEVEL 096	<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 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 368A						

12. LICENSEE CONTACT FOR THIS LER

NAME S. J. Kowalski, Plant Engineering	TELEPHONE NUMBER (Include Area Code) (217) 937-2818
-------------------------------------------	--------------------------------------------------------

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

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 3/20/06, at about 0450 hours with the plant at about 96 percent power, an open circuit in the C phase neutral Current Transformer (CT) of the Main Generator output caused the Generator Differential Overcurrent 87-G1 relay to trip due to a sensed current imbalance. Actuation of the 87-G1 relay resulted in a Generator Trip / Lockout and an automatic Turbine Electro Hydraulic Control (EHC) trip. The Turbine EHC trip caused a Turbine Control Valve fast closure and a Reactor Protection System signal for the automatic scram. A loose terminal screw on the CT lead wire caused the open circuit, resulting in high resistance and overheating that melted the wire. The cause of this event was inadequate workmanship that occurred during Generator High-Potential testing, as a result of a process weakness. The inadequate workmanship most likely occurred during the eighth refueling outage. Terminal screws at the C phase CT were most likely loosened to install test leads and not adequately retightened following removal of the test leads, resulting in a failure of the wire termination. Corrective action includes adding process controls to ensure that lifted and landed leads will be adequately tightened in the future.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)	
Clinton Power Station, Unit 1	05000461	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	2 OF 3	
		2006	- 001	- 00		

NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

PLANT OPERATING CONDITIONS PRIOR TO THE EVENT

Unit: 1 Event Date: 3/20/2006 Event Time: 0450 Central Standard Time
Mode: 1 (Power Operation) Reactor Power: 96 percent

DESCRIPTION OF EVENT

On 3/20/06, at about 0450 hours with the plant at about 96 percent power, operators observed Switchyard [FK] 345 kilovolts gas circuit breakers [BKR] for the Main Power Transformer [XFMR] trip open and received a Main Generator [EL] / Turbine [TA] trip, resulting in an automatic reactor scram. At the time of the event, the plant was at 1108 Megawatts Electric and 3329 Megawatts Thermal, with condenser vacuum stable at 27.8 inches of mercury. No work was being performed at the time of the event.

Operators took immediate actions in accordance with off-normal procedure CPS 4100.01, Reactor Scram, including immediately verifying that all control rods fully inserted.

About 4 seconds after the scram, as expected, reactor water level dropped below the Low, Level 3 trip setpoint, causing Primary Containment Isolation Valves [ISV] in Groups 2 (Residual Heat Removal [RHR] [BO]), 3 (RHR), and 20 (miscellaneous systems) to receive signals to shut. Operators entered Emergency Operating Procedure (EOP)-1, RPV Control. The Level 3 trip cleared 10 seconds later. (At about 0524 hours, operators verified that the valves responded to the Level 3 trip as required.)

Approximately 32 seconds after the scram, the Motor [MO]-Driven Reactor Feed Pump [SJ] [P] (MDRFP) started unexpectedly, resulting in all three Reactor Feed Pumps running (including the two Turbine [TRB]-Driven Reactor Feed Pumps); the MDRFP did not inject into the vessel. Issue Report 468516 and Work Order 903843 have been initiated to investigate the unexpected start of the MDRFP. About 10 seconds later, reactor water level swelled and reached the Level 8, high water level trip setpoint, causing all three Reactor Feed Pumps to trip off.

The MDRFP was restarted at about 0456 hours to control reactor water level. Reactor pressure was controlled using turbine bypass valves.

At about 0605 hours, operators exited EOP-1, all EOP entry conditions were cleared and the plant was in stable condition in Mode 3 (Hot Shutdown).

A troubleshooting team investigating the cause of this event identified that the C phase neutral Current Transformer (CT) [XCT] of the Main Generator output was found to have an open circuit. The open circuit was traced to a junction box [JBX] under the Main Generator. A loose terminal screw caused the open circuit on the CT lead wire by causing high resistance and overheating of the wire. The open circuit caused the Generator Differential Overcurrent 87-G1 [87] relay to trip due to a sensed current imbalance. Actuation of the 87-G1 relay resulted in a Generator Trip / Lockout and an automatic Turbine Electro Hydraulic Control (EHC) [TG] trip. The Turbine EHC trip caused a Turbine Control Valve [V] fast closure and a Reactor Protection System [JC] signal for the automatic scram.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Clinton Power Station, Unit 1	05000461	2006	- 001	- 00	3 OF 3

NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

Issue Report 468357 was initiated to perform a root cause evaluation of the reactor scram and to identify corrective action.

No automatic or manually initiated safety system responses were necessary to place the plant in a safe and stable condition. No other inoperable equipment or components directly affected this event.

CAUSE OF EVENT

The cause of this event was inadequate workmanship that occurred during Generator High-Potential testing, as a result of a process weakness. The inadequate workmanship most likely occurred during the eighth refueling outage. Terminal screws were most likely loosened to install test leads, and following removal of the test leads, the terminal screw was not adequately retightened, resulting in a failure of the wire termination.

SAFETY ANALYSIS

This event is reportable under the provisions of 10CFR50.73(a)(2)(iv)(A) as an event that resulted in an automatic reactor scram while the reactor was critical.

The response and behavior of the plant and operator performance during this event were compared to the Generator Load Rejection transient discussed in Chapter 15 of the Updated Safety Analysis Report and the General Electric Transient Safety Analysis Report and were determined to be within those analyses. This event posed no challenges to fission product barriers. All systems responded as required for an event without bypass valve failure.

No safety system functional failures occurred during this event.

CORRECTIVE ACTION

Process controls are being added to ensure that lifted and landed leads will be adequately tightened in the future. The quality control checklist of the contractor will be revised to include controls similar to those used in the Clinton Power Station procedure for Wire Removal/Jumper Installation, including a step to perform a pre-job brief on the requirements. (468357-19)

The other Main Generator CT connections have been verified to be tight.

Technicians removed the CT from the neutral bus bar under a temporary modification due to concerns that the CT may have been stressed and could fail. A replacement CT was not available.

PREVIOUS OCCURRENCES

None

COMPONENT FAILURE DATA

Manufacturer	Nomenclature	Manufacturer Model Number	Serial Number
None			

SUMMARY OF COMMITMENTS

The following table identifies commitments made in this document. (Any other actions discussed in the submittal represent intended or planned actions. They are described to the NRC for the NRC's information and are not regulatory commitments.)

COMMITMENT	COMMITMENT TYPE	
	ONE-TIME ACTION (Yes/No)	Programmatic (Yes/No)
This document has no regulatory commitments.		