

# Exelon®

Nuclear

Clinton Power Station  
8401 Power Road  
Clinton, IL 61727-9351

10 CFR 50.73  
SRRS 5A.108

U-603929  
November 20, 2009

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

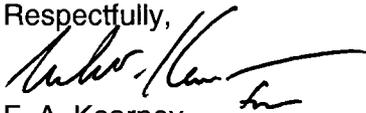
Subject: Licensee Event Report 2009-004-00

Enclosed is Licensee Event Report (LER) No. 2009-004-00: Steam Leak Due to Valve Packing Torque Results in Required Unit Shutdown. This report is being submitted in accordance with the requirements of 10 CFR 50.73

There are no regulatory commitments contained in this letter.

Should you have any questions concerning this report, please contact D. E. Hupp, at (217)-937-2509.

Respectfully,



F. A. Kearney  
Site Vice President  
Clinton Power Station

RSF/blf

Enclosures: Licensee Event Report 2009-004-00

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

JE22  
NRR

**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> Clinton Power Station, Unit 1	<b>2. DOCKET NUMBER</b> 05000461	<b>3. PAGE</b> 1 OF 4
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**4. TITLE**  
Steam Leak Due to Valve Packing Torque Results in Required Plant Shutdown

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
09	30	09	2009	004 - 00		11	20	09	None	05000
									FACILITY NAME	DOCKET NUMBER
									None	05000

<b>9. OPERATING MODE</b>  3	<b>11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §:</b> (Check all that apply)			
<b>10. POWER LEVEL</b>  0.00	<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 checked="" 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**

NAME D. E. Hupp, Component Specialist, Rotating Equipment	TELEPHONE NUMBER (Include Area Code) (217) 937-2509
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**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
D	BN	ISV	A391	Y					

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

On 9/29/09, at 1544 hours, with reactor power at 96.9%, operators began noting indications of a steam leak in the Drywell. By 1616 hours, Drywell floor drain leakage rate had increased from 0.25 gallons per minute (gpm) to 3.4 gpm, exceeding the limit of 2 gpm increase in the previous 24 hour period while in Mode 1 specified in Technical Specification (TS) 3.4.5, Reactor Coolant System (RCS) Operational Leakage. In response to the increased leakage, operators entered the TS 3.4.5 Required Action to verify within 4 hours the source of the unidentified leakage source is not service sensitive type 304 or type 316 austenitic stainless steel. At 1850 hours, the station was unable to determine that the source of the increase in unidentified leakage was not service sensitive type 304 or type 316 austenitic stainless steel; operators entered the TS 3.4.5 Required Actions to bring the unit to cold shutdown, and cold shutdown was achieved at 1834 hours on 9/30/09. Investigation identified a valve stem packing leak in the Drywell. The causes of this event were the valve stem is off-center with the stuffing box and work instructions did not require the packing to be torqued to the as-left value from the original installation. Corrective actions for this event include replacing the packing, investigating the cause of the off-center valve stem, and verifying packing torque for other valves.

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

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE		
Clinton Power Station, Unit 1	05000461	YEAR	SEQUENTIAL NUMBER	REV NO.	2	OF	4
		2009	- 004	- 00			

**NARRATIVE**

**PLANT OPERATING CONDITIONS**

Unit: 1  
 Event Date: 9/30/09  
 Event Time: 0340 hours Central Daylight Time  
 Mode: 3 (Hot Shutdown)  
 Reactor Power: Zero Percent

**DESCRIPTION OF EVENT**

On 9/29/09, at 1544 hours, with the unit in Mode 1 (Power Operation) and reactor power at 96.9 percent, operators began noting indications of a steam leak in the Drywell. Drywell pressure increased from 0.68 to 0.81 pounds per square inch gage (psig), Drywell temperature increased from 105 to 106 degrees Fahrenheit (F), the Drywell cooler differential temperature high alarm [ALM] actuated, Drywell Cooling Heating Ventilating and Air Conditioning [VB] chiller [CHU] amps increased from 50 to 56 amps, and fission product monitor [IJ] [MON] particulate and iodine indications were trending up. In response to indications of a steam leak, at 1555 hours operators entered the abnormal coolant leakage procedure and evacuated containment.

At 1610 hours, the fission product monitor alarmed high with particulates at 7000 counts per minute. In response to the alarm, operators entered the abnormal release of airborne radioactivity procedure.

By 1616 hours, Drywell floor drain leakage rate had increased from 0.25 gallons per minute (gpm) to 3.4 gpm, exceeding the limit of 2 gpm increase in the previous 24 hour period while in Mode 1 specified in Technical Specification (TS) 3.4.5, Reactor Coolant System (RCS) Operational Leakage. In response to the increased leakage, operators entered Required Action B.1 of TS 3.4.5 to verify within 4 hours that the source of the unidentified leakage is not service sensitive type 304 or type 316 austenitic stainless steel.

At 1730 hours, with the unit at 96.9% power, operators initiated an orderly plant shutdown due to the elevated Drywell leakage rate.

At 1850 hours, the station was unable to determine that the source of the increase in unidentified leakage was not service sensitive type 304 or type 316 austenitic stainless steel; therefore operators entered Required Actions C.1 and C.2 of TS 3.4.5 which require the reactor to be in Mode 3 (Hot Shutdown) within 12 hours and Mode 4 (Cold Shutdown) within 36 hours.

At 1930 hours, Drywell floor drain leakage (unidentified leakage) was 3.3 gpm and stable.

At 1946 hours, Clinton Power Station (CPS) completed a 4-hour notification to the NRC Operations Center in accordance with 10 CFR 50.72(b)(2)(i) via Event Notification 45390 for the initiation of a nuclear plant shutdown required by the plant's Technical Specifications.

At 0100 hours on 9/30/09, operators placed the reactor mode switch [HS] in startup & hot standby and the unit entered Mode 2 (Startup). The reactor was sub-critical at 0202 hours.

At 0340 hours on 9/30/09, operators placed the reactor mode switch in the shutdown position to complete the reactor shutdown, inserting a planned manual scram in accordance with the unit shutdown procedure, and the unit entered Mode 3. The plant entered Mode 4 at 1834 hours on 9/30/09.

Following plant shutdown, a walkdown of the Drywell identified steam leakage at Reactor Core Isolation

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE		
Clinton Power Station, Unit 1	05000461	YEAR	SEQUENTIAL NUMBER	REV NO.	3	OF	4
		2009	- 004	- 00			

**NARRATIVE**

Cooling (RCIC) [BN] steam line inboard isolation valve [ISV] 1E51-F063. The steam leakage from valve 1E51-F063 was verified to be a packing leak. No other significant steam leaks were identified during the initial or subsequent walkdowns of the drywell.

No other inoperable equipment or components directly affected this event.

Issue Report 972235 was initiated to investigate and correct this issue.

**CAUSE OF EVENT**

This event has two root causes. The first root cause is the valve stem of valve 1E51-F063 is off-center with the stuffing box with potential to cause packing side loading and accelerated loss of packing load. While packing the valve during this unit shutdown, maintenance technicians identified the stem was off-center with the stuffing box. Further scale measurements indicated the off-set condition was present in the same direction at the yoke-to-operator interface. If a valve stem is not centered in the stuffing box, when the valve is stroked, the stem will side load the packing set. Side loading will cause uneven stresses in the packing set and can be a contributor to accelerated packing failure. Additional detailed measurements should be obtained to confirm and correct the source for the off-set condition. In 2004, packing was installed in 1E51-F063 while the valve bonnet was in the shop before the bonnet was installed on the valve. If the source of the condition is the valve operator alignment, then the condition could not have been identified in 2004 when the packing was installed since the operator was not in place during that packing activity.

The second root cause is work instructions did not require the packing in 1E51-F063 to be torqued to the as-left value from the original installation. In February 2004, the valve was modified to eliminate the leak-off line to provide more reliable valve stem packing due to the chronic valve packing leakage the valve has experienced. An additional work order was performed for this valve in February 2006 to verify packing torque based on a recommendation from another Exelon site to confirm the packing torque was within tolerance after one fuel cycle. Work instructions for the torque confirmation activity in 2006 did not include information on the specific torque value for the packing. The instructions were "do not exceed torque values listed on the Journeyman Worksheet," (that is, 32 to 39 foot-pounds). Using the plus or minus 2 foot-pounds tolerance of the torque wrench, the as-left value was 30 foot-pounds versus the as-found value of 29 foot-pounds.

**SAFETY ANALYSIS**

This event is reportable under the provisions of 10 CFR 50.73(a)(2)(i)(A) due to completion of the nuclear plant shutdown required by plant TS 3.4.5.

This event had minimal safety significance. The reactor was shut down safely and maintained in a safe shut down condition. The packing leak was less than the total allowed leakage of 30 gpm over the previous 24-hour period provided in the limitations of TS 3.4.5. Although the steam leak added heat load to the ventilation system and condensed water volume to the floor drain system, the leakage was within the design capabilities of the reactor coolant system inventory makeup, the drywell floor drain system, and the drywell ventilation system. There was no release of radioactive material to the environment. Operators continually monitored the leakage during this event.

This event report does not identify any safety system functional failures.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE		
Clinton Power Station, Unit 1	05000461	YEAR	SEQUENTIAL NUMBER	REV NO.	4	OF	4
		2009	- 004	- 00			

**NARRATIVE**

**CORRECTIVE ACTION**

The packing in valve 1E51-F063 was replaced and the proper torque was applied.

The cause for valve 1E51-F063 valve stem being off-center with the stuffing box will be investigated and corrected.

Other valves were modified in February 2004 to eliminate the leak-off lines to provide more reliable valve stem packing. The packing torque applied to these additional valves will be verified and corrected as necessary.

**PREVIOUS OCCURRENCES**

None

**COMPONENT FAILURE DATA**

Manufacturer: Anchor Darling Valve Company  
 Nomenclature: 8-inch, 600-pounds per square inch, Flex Wedge Gate Valve  
 Manufacturer Model Number: 93-14582