

AmerGenSM

An Exelon Company

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

10 CFR 50.73

U-603690

September 10, 2004

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 2004-004-00

Enclosed is Licensee Event Report (LER) No. 2004-004-00: Reactor Scram While Placing Residual Heat Removal B into Shutdown Cooling. This report is being submitted in accordance with the requirements of 10CFR50.73.

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

Respectfully,



R. S. Bement
Site Vice President
Clinton Power Station

JLP/blf

Enclosure: Licensee Event Report 2004-004-00

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



LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

1. FACILITY NAME Clinton Power Station	2. DOCKET NUMBER 05000461	3. PAGE 1 OF 3
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4. TITLE
Reactor Scram While Placing Residual Heat Removal 'B' Into Shutdown Cooling

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
07	14	2004	2004	- 004 -	00	09	10	04	None	05000
									FACILITY NAME	DOCKET NUMBER
									None	05000

9. OPERATING MODE 3	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)									
	20.2201(b)	20.2203(a)(3)(ii)	50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)						
10. POWER LEVEL 00	20.2201(d)	20.2203(a)(4)	50.73(a)(2)(iii)	50.73(a)(2)(x)						
	20.2203(a)(1)	50.36(c)(1)(i)(A)	x 50.73(a)(2)(iv)(A)	73.71(a)(4)						
				20.2203(a)(2)(i)	50.36(c)(1)(ii)(A)	50.73(a)(2)(v)(A)	73.71(a)(5)			
				20.2203(a)(2)(ii)	50.36(c)(2)	50.73(a)(2)(v)(B)	OTHER			
				20.2203(a)(2)(iii)	50.46(a)(3)(ii)	50.73(a)(2)(v)(C)	Specify in Abstract below or in			
				20.2203(a)(2)(iv)	50.73(a)(2)(i)(A)	50.73(a)(2)(v)(D)	NRC Form 366A			
				20.2203(a)(2)(v)	50.73(a)(2)(i)(B)	50.73(a)(2)(vii)				
				20.2203(a)(2)(vi)	50.73(a)(2)(i)(C)	50.73(a)(2)(viii)(A)				
				20.2203(a)(3)(i)	50.73(a)(2)(ii)(A)	50.73(a)(2)(viii)(B)				

12. LICENSEE CONTACT FOR THIS LER

NAME David H. Schavey, Operations	TELEPHONE NUMBER (Include Area Code) (217) 937-2200
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13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED				15. EXPECTED SUBMISSION DATE		
YES (If yes, complete EXPECTED SUBMISSION DATE)	X	NO		MONTH	DAY	YEAR

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

On July 14, 2004, with the plant in Mode 3 (Hot Shutdown) due to a reactor scram that occurred at 1608 on July 13, 2004, operators were warming the Residual Heat Removal (RHR) system B loop in preparation to place RHR Shutdown Cooling (SDC) in service in order to proceed to Mode 4 (Cold Shutdown). At 0044 hours, reactor pressure vessel (RPV) water level decreased from +32 inches to +9 inches, resulting in an RPV low water level (Level 3) Reactor Protection System actuation and a containment isolation (Groups 2, 3, and 20). Within six seconds of RPV water level reaching Level 3, level recovered above the scram setpoint, as feedwater flow to the RPV increased and the RHR piping was refilled. The cause of the event was determined to be a deficient RHR SDC procedure which did not provide adequate guidance for re-warming the system and introduced a latent error through valve sequencing that allowed a column separation effect to occur while warming the system. The corrective actions are to revise the RHR SDC procedure.

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FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
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NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

A. PLANT OPERATING CONDITIONS PRIOR TO THE EVENT:

Unit: 1 Event Date: 7/14/2004 Event Time: 0044 Central Daylight Time
 Mode: 3 (HOT SHUTDOWN) Reactor Power: 0 percent

B. DESCRIPTION OF THE EVENT:

On July 14, 2004, operators were warming the Residual Heat Removal (RHR) [BO] B loop while making preparations for placing the Shutdown Cooling (SDC) mode of RHR into service. At 0044 hours (Central Daylight Time), reactor pressure vessel (RPV) water level decreased from +32 inches to +9 inches, resulting in an automatic RPV low water level (Level 3) scram actuation and a containment isolation (Groups 2, 3, and 20). At the time of the event, the plant was in Mode 3 (Hot Shutdown) with all control rods fully inserted from the reactor scram that occurred on July 13, 2004 at 1608 hours (Reference LER 2004-003), and operators were preparing to proceed to Mode 4 (Cold Shutdown).

After completing the flush of the RHR B system on July 13, 2004 at 2128 hours, RHR B system warmup commenced at 2255 hours. At 0017 hours on July 14, 2004, warming was stopped and a fill and vent of the RHR B heat exchanger was started. A sharp drop in temperature and pressure was observed and the fill and vent evolution was terminated. At 0030, operators commenced re-warming of the RHR B loop and opened valve 1E12F040 (RHR B flush valve to radwaste) for about 8 to 9 seconds, and the 1E12F003B (RHR B heat exchanger outlet valve) was throttled open for about 1 to 2 seconds. This allowed water from the RHR B heat exchanger and the RHR B discharge header to be discharged to radwaste. At 0043 hours, operators opened the 1E12F040 valve for an additional 3 to 4 seconds to continue the warming process. Approximately one minute after throttling the valve open, RPV water level dropped approximately 24 inches in about 20 seconds. At 0044 hours, a Reactor Protection System (RPS) actuation (i.e., scram) due to RPV water level reaching Level 3 occurred. The operators entered procedure CPS No. 4401.01, "Reactor Scram," and Emergency Operating Procedure (EOP) EOP-1, "RPV Level Control." At 0047 hours, all isolations occurred as expected for reaching RPV Level 3. At 0051 hours, the scram was reset, and at 0111 hours, EOP-1 was exited. At 0129 hours, CPS 4401.01 was exited.

The opening of 1E12F040, while using valve 1E12F003B to throttle and control the flow of reactor coolant to warm the system, allowed the phenomenon of "column separation" to occur in the system. This phenomenon occurs when a line is drained without a vent path, creating a vacuum in the pipe. Subsequent analysis of the event showed that due to the low differential pressure between the RPV, which was at 18 psig, and the RHR B heat exchanger, which was at 10 psig, there was not enough differential pressure between the RPV and the RHR B system to develop flow through the RHR B pump discharge check valve (1E12F031B) to make up for the flow to radwaste. This allowed additional column separation to occur in the discharge piping. When the 1E12F040 valve was throttled an additional 3 to 4 seconds open for additional warming, the RHR B heat exchanger pressure decreased. At that point, the differential pressure was sufficient to open the 1E12F031B check valve and the RHR B system was refilled with water from the RPV, causing the RPV level to drop, equalizing level between the RPV and RHR B heat exchanger.

Condition Report 235832 was initiated to investigate this event.

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Clinton Power Station, Unit 1	05000461	2004	- 004	- 00	3 OF 3

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

C. CAUSE OF THE EVENT:

A root cause of this event was that the RHR SDC procedure did not adequately prohibit or provide adequate guidance for re-warming of the system. The procedure introduced a latent error through valve sequencing that allowed the column separation effect to occur while warming the system.

D. SAFETY ANALYSIS:

This event did not constitute a risk to the public, the plant, or station personnel. Sufficient engineered safety features existed to prevent more serious consequences. There were no actual safety consequences associated with this event. The event was reviewed for analyzed transients discussed in Chapter 15 of the Clinton Power Station Updated Safety Analysis Report. The analysis determined that this event was within the design basis of the plant.

No safety system functional failures occurred during this event.

E. CORRECTIVE ACTIONS:

The warming sequence of the RHR SDC procedure will be revised to preclude column separation.

F. PREVIOUS OCCURRENCES:

There have been no previous similar events at Clinton Power Station or in the industry due to the phenomenon of column separation.

G. COMPONENT FAILURE DATA:

None.