

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Clinton Power Station	DOCKET NUMBER (2) 0 5 0 0 0 4 6 1 1	PAGE (3) 1 of 0 4
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TITLE (4) Hydraulic Surge During Reactor Pressure Vessel Water Level Transmitter Restoration Results in High Pressure Core Spray Injection Because of Sensor System Design

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)		
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES		
0 9	0 1	8 8	8 8	0 2	2	0 0	0 9	3 0	None		
									DOCKET NUMBER(S)		
									0 5 0 0 0 0		

OPERATING MODE (9) 1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §. (Check one or more of the following) (11):									
POWER LEVEL (10) 1 0 0	<input type="checkbox"/> 20.402(b)	<input type="checkbox"/> 20.405(a)	<input checked="" type="checkbox"/> 60.73(a)(2)(iv)	<input type="checkbox"/> 73.71(b)						
	<input type="checkbox"/> 20.405(a)(1)(i)	<input type="checkbox"/> 60.36(a)(1)	<input type="checkbox"/> 60.73(a)(2)(v)	<input type="checkbox"/> 73.71(c)						
	<input type="checkbox"/> 20.405(a)(1)(ii)	<input type="checkbox"/> 60.36(a)(2)	<input type="checkbox"/> 60.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Part, NRC Form 306A)						
	<input type="checkbox"/> 20.405(a)(1)(iii)	<input type="checkbox"/> 60.73(a)(2)(i)	<input type="checkbox"/> 60.73(a)(2)(vii)(A)							
	<input type="checkbox"/> 20.405(a)(1)(iv)	<input type="checkbox"/> 60.73(a)(2)(ii)	<input type="checkbox"/> 60.73(a)(2)(vii)(B)							
<input type="checkbox"/> 20.405(a)(1)(v)	<input type="checkbox"/> 60.73(a)(2)(iii)	<input type="checkbox"/> 60.73(a)(2)(viii)								

LICENSEE CONTACT FOR THIS LER (12)

NAME T. J. Camilleri, Assistant Manager - Plant Maintenance X3204	TELEPHONE NUMBER
	AREA CODE: 2 1 7 9 3 5 - 8 8 8 1

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUF. TURER	REPORTABLE TO NPROS	CAUSE	SYSTEM	COMPONENT	MANUF. TURER	REPORTABLE TO NPROS
X	JIE	LIT	R 3 6 9	N					

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE):	<input checked="" type="checkbox"/> NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR

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

ABSTRACT

On September 1, 1988, with the plant in Mode 1 (POWER OPERATION), a false low reactor pressure vessel (RPV) water level signal caused an automatic initiation of the High Pressure Core Spray (HPCS) system and injection of water into the reactor. The event occurred while a technician was restoring an RPV water level transmitter to service following calibration. The technician opened one of the transmitter's two high pressure side isolation valves creating a hydraulic surge in the sensing line. This surge caused two adjacent RPV water level transmitters on the common sensing line to actuate and complete the trip logic for HPCS initiation. The root cause of this event is attributed to the sensor system design. The sensitivity of the sensor system to minor changes in sensing line pressure does not allow system operation and maintenance, under controlled conditions, without the risk of false level signals. Corrective actions include briefing technicians on the event, investigating methods for bypassing the trip functions during maintenance, investigating actions to reduce system sensitivity, reviewing procedures to ensure proper precautions are included for pressure sensing system work, and reviewing the possibility of scheduling level transmitter surveillances during plant outages.

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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		

TEXT (if more space is required, use additional NRC Form 366A's) (17)

DESCRIPTION OF EVENT

On September 1, 1988, at approximately 2235 hours, with the plant in Mode 1 (POWER OPERATION), at 100% reactor [RCT] power, a false low reactor pressure vessel (RPV) water level signal caused an automatic initiation of the High Pressure Core Spray (HPCS) system [BG] and injection of water into the reactor.

On September 1, at approximately 2035 hours, utility Control and Instrumentation (C&I) technicians began Calibration Surveillance 9432.04, "Nuclear Steam Supply Shutoff System Reactor Vessel Water Level B21-N081A (B,C,D) Channel Calibration". As required by the calibration procedure, level transmitter [LT] 1B21-N081C was isolated from the system prior to beginning the calibration steps. At approximately 2235 hours, a C&I technician completed the calibration steps and began restoring transmitter 1B21-N081C to service in accordance with Maintenance Procedure 8801.12, "Local Mounted Instrument Valve [V] Operation". With the transmitter equalizing valve open, the technician opened one of two instrument valves which isolate the transmitter high pressure side. The transmitter was still isolated from the instrument sensing lines during this valve operation, however, opening this valve created a hydraulic surge in the common sensing line for transmitter 1B21-N081C. This surge caused two adjacent RPV water level transmitters, 1B21-N073C and 1B21-N073G, on the common sensing line to actuate. The actuation of these two transmitters completed the one-out-of-two-twice low RPV water level trip logic for HPCS initiation and resulted in the automatic start of the HPCS pump [P], the opening of injection valve [INV] 1E22-F004, and the injection of water into the RPV for twenty-eight seconds.

In the main control room, at approximately 2235 hours, RPV low water level (level 2) and RPV high water level (level 8) alarms [ALM] annunciated. These alarms cleared and reset within a short period of time. The control room operators verified that RPV water level was normal and then closed the injection valves and secured the HPCS pump. Since the low RPV water level trip signal was short in duration, less than twenty milliseconds, the Division III (HPCS) diesel generator [DG][EK] and the Shutdown Service Water system [BI] pump did not automatically start. Design of the logic for the start of the HPCS system is such that trip signals with a duration less than twenty-five milliseconds may not actuate all associated equipment. Plant conditions were returned to normal by 2300 hours.

During this event, reactor water level increased from thirty-five inches to fifty inches, decreased to twenty-two inches, and then returned to thirty-five inches. Reactor pressure decreased from 1002 pounds per square inch (psi) to 995 psi and then increased to 1002 psi. Reactor power decreased from 100% to 93% and then increased to 100% after the transient.

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TEXT IF more space is required, use additional NRC Form 365A's (17)

An "Unusual Event" was declared at 2250 hours and terminated at 2300 hours.

No automatic or manually initiated safety system responses were necessary to place the plant in a safe and stable condition. No other equipment or components were inoperable at the start of this event such that their inoperable condition contributed to this event.

CAUSE OF EVENT

The technician who conducted the surveillance was aware of the sensitive nature of returning the transmitter to service and was aware that it performed a trip function. The technician reported that the valve manipulations were conducted slowly and that no unusual conditions existed.

Similar events involving HPCS initiations while returning transmitters to service occurred during 1987 (LERs 87-014-00, 87-022-00 and 87-026-00). Corrective actions from these occurrences included procedural changes which require transmitters to be pressurized to existing system pressure prior to valving the transmitters back into service. These steps were correctly followed during the return of transmitter 1B21-N081C to service.

The root cause of this event is attributed to the sensor system design. The sensitivity of the sensor system to minor changes in sensing line pressure does not allow system operation and maintenance, under controlled conditions, without the risk of false level signals.

CORRECTIVE ACTION

Appropriate C&I personnel were briefed on this event.

To prevent recurrence of a similar event, Illinois Power Company will take the following actions:

- ° Methods for bypassing trip functions while conducting RPV level transmitter maintenance will be investigated. This action is expected to be completed November 30, 1988.
- ° System sensitivity to minor pressure variations will be investigated to determine if any actions can be taken to reduce this sensitivity to routine maintenance and operating events. This action is expected to be completed by November 14, 1988.

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TEXT (if more space is required, use additional NRC Form 365A-2) (17)

- ° Maintenance procedures will be reviewed to ensure proper precautions are included for conducting work on pressure sensing systems and for changing valve operating sequences to minimize system pressure perturbations. This action is expected to be completed by November 25, 1988.
- ° Surveillance requirements for RPV water level transmitters will be reviewed to determine if the surveillances can be performed during plant outages. This action is expected to be completed by November 25, 1988.

ANALYSIS OF EVENT

This event is reportable under the provisions of 10CFR50.73(a)(2)(iv) due to the automatic actuation of an Engineered Safety Feature.

Assessment of the safety consequences and implications of this event indicates that this event was not safety significant. This event is bounded by the Inadvertent HPCS Pump Startup Transient discussed in Chapter 15 of the Final Safety Analysis Report. This transient has been determined to be acceptable.

ADDITIONAL INFORMATION

The level transmitters discussed in this LER are all model number 1153DB5PC manufactured by Rosemount, Incorporated.

LER 87-004-00 discussed a Division I Emergency Core Cooling System [BM] automatic initiation which resulted from a hydraulic surge in an instrument line. This surge occurred while a technician was returning a transmitter to service.

LERs 87-014-00, 87-022-00, and 87-026-00 discussed automatic initiations of HPCS which resulted from hydraulic surges in instrument lines. These surges occurred while technicians were returning transmitters to service.

For further information regarding this event, contact T. J. Camilleri, Assistant Manager - Plant Maintenance at (217) 935-8881, extension 3204.

ILLINOIS POWER COMPANY



CLINTON POWER STATION, P.O. BOX 678, CLINTON, ILLINOIS 61727

September 30, 1988

10CFR50.73

Docket No. 50-461

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Subject: Clinton Power Station - Unit 1
Licensee Event Report No. 88-022-00

Dear Sir:

Please find enclosed Licensee Event Report No. 88-022-00:
Hydraulic Surge During Reactor Pressure Vessel Water Level Transmitter
Restoration Results in High Pressure Core Spray Injection Because of
Sensor System Design. This report is being submitted in accordance with
the requirements of 10CFR50.73.

Sincerely yours,

A handwritten signature in dark ink, appearing to read 'D. L. Holtzsch'.

D. L. Holtzsch
Acting Manager - Licensing and
Safety

RSF/pgc

Enclosure

cc: NRC Resident Office
NRC Region III, Regional Administrator
INPO Records Center
Illinois Department of Nuclear Safety
NRC Clinton Licensing Project Manager

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