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ILLINOIS POWER COMPANY

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

March 13, 1990

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. 90-001-00

Dear Sir:

Please find enclosed Licensee Event Report No. 90-001-00: Failure to Remove Preservative from Valve Results in Accumulation of Dirt on Sealing Surface, Failure to Meet Primary Containment Integrity and Plant Shutdown This report is being submitted in accordance with the requirements of 10CFR50.73.

Sincerely yours,

F. A. Spangenberg, III
Manager - Licensing and Safety

RSF/krm

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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1/1

NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

LICENSEE EVENT REPORT (LER)

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TITLE (4) Failure to Remove Preservative from Valve Results in Accumulation of Dirt on Sealing Surface, Failure to Meet Primary Containment Integrity and Plant Shutdown

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	DOCKET NUMBER(S)
0 2	1 2	9 0	9 0	0 0 1	0 0	0 3	1 3	9 0	None	0 5 0 0 0
										0 5 0 0 0

OPERATING MODE (9)	POWER LEVEL (10)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
1	1 0 0	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	X 50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
R. W. Morgenstern, Director-Plant Technical, extension 3210	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	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	
B	V A	I S V	P 3 0 4	Y							

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

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

On February 12, 1990, with the plant in POWER OPERATION, Drywell Purge System containment penetration 1MC-102 failed its Local Leak Rate Test (LLRT). Performance of the LLRT is required by Technical Specification (TS) 4.6.1.8.3 to demonstrate that Drywell Purge containment isolation valves 1VQ004A and 1VQ004B are operable. The leakage rate determined by the LLRT also resulted in exceeding the total secondary containment bypass leakage limits of TS 3.6.1.2.d. The requirements of TS 3.6.1.1 for Primary Containment Integrity (PCI) were also not met. The Shift Supervisor entered the action statement of TS 3.6.1.1 which requires restoration of PCI within one hour or shutdown of the plant. Troubleshooting to determine which valve was causing the leakage was unsuccessful and an orderly plant shutdown was then performed. The cause of this event was the failure to remove Cosmolene from the surface of 1VQ004B prior to initial installation. The Cosmolene caused dirt to accumulate on the sealing surface of the valve and a requirement to stroke the valves quarterly allowed foreign materials to enter the valve sealing surface. Corrective actions for this event include: replacing valves 1VQ004A and 1VQ004B; identifying and investigating similar valves; and tagging the valves shut to eliminate the stroking requirement.

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

DESCRIPTION OF EVENT

On February 12, 1990, the plant was in Mode 1 (POWER OPERATION) at approximately 100 percent reactor [RCT] power. The valves [V] of Drywell Purge System [VA] containment penetration [PEN] 1MC-102 were aligned to perform the Local Leak Rate Test (LLRT) of the penetration in accordance with surveillance procedure 9861.02, "Local Leak Rate Testing Requirements". The LLRT of 1MC-102 is performed quarterly to demonstrate that thirty-six inch diameter outboard and inboard Drywell Purge containment isolation valves [ISV] 1VQ004A and 1VQ004B (respectively) are operable as specified in Technical Specification 4.6.1.8.3. The boundary for this LLRT includes valves 1VQ004A, 1VQ004B, and outboard and inboard containment isolation bypass valves 1VQ006A and 1VQ006B (respectively).

At 1430 hours, with the LLRT in progress and the pressure at 8.3 pounds per square inch gauge (psig), test engineers determined that the leakage rate of 1MC-102 was 18,500 standard cubic centimeters per minute (sccm). In response to this determination, test engineers leak-checked the packing of each valve within the test boundary and visually checked valve 1VQ006B for seat leakage (1VQ006B was the only valve accessible for this type of check). These checks did not identify any leakage. The test pressure was then increased to 9.6 psig (required test pressure is 9.0 psig minimum) resulting in a leakage rate through 1MC-102 of 19,000 sccm. The maximum acceptable primary containment leakage allowed by Technical Specification 4.6.1.8.3 through valves 1VQ004A and 1VQ004B is 3705 sccm per valve. Therefore, the requirements of Technical Specification 3.6.1.8 were not met. Technical Specification 3.6.1.8 requires that 1VQ004A and 1VQ004B be operable in Modes 1, 2 (STARTUP) and 3 (HOT SHUTDOWN).

At 1630 hours, test engineers notified the Assistant Shift Supervisor (A/SS) that the leakage rate for penetration 1MC-102 including valves 1VQ004A, 1VQ004B, 1VQ006A and 1VQ006B was greater than that allowed by Technical Specification 3.6.1.8. The A/SS was also notified that this leakage rate increased the calculated total secondary containment bypass leakage rate to 38,567 sccm. In accordance with Technical Specification 3.6.1.2.d, the maximum total secondary containment bypass leakage is limited to 29,642 sccm and therefore the requirements of this specification were also not met.

Since the definition of primary containment integrity requires, in part, that the leakage limits of Technical Specification 3.6.1.2 be met, the Shift Supervisor determined that the requirements of primary containment integrity were not met as required by Technical Specification 3.6.1.1. For this reason, he entered the action statement of this specification. This action statement requires that primary containment integrity be restored within one hour or that the plant be in at least HOT SHUTDOWN

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within the next twelve hours and in COLD SHUTDOWN within the following twenty-four hours.

Between 1630 hours and 2100 hours on February 12, 1990, test engineers performed troubleshooting in an attempt to quantitatively determine which valve was causing the leakage. However, because of the plant configuration, they were unable to make that determination.

At 2100 hours, in preparation for an orderly plant shutdown, operators began reducing reactor power at a rate of approximately 200 megawatts per hour using reactor recirculation [AD] flow.

At 2220 hours, with the plant at sixty-five percent reactor power, operators began inserting control rods to continue the reduction of reactor power.

At 0524 hours on February 13, 1990, with the plant at fifteen percent reactor power, operators initiated a manual reactor scram and placed the plant in Mode 3.

At approximately 0600 hours, reactor pressure had decreased to less than 700 psig. This created a flow path for the Condensate Booster [SD] pumps to feed into the reactor vessel through Reactor Feed Pump Discharge Bypass Throttle Valve 1FW003A which was tagged out. However, the pressure of the feed pump had previously forced the valve to the open position. This caused an increase in reactor water level to Level 8 (High Water Level). At that point, operators tripped the condensate booster pumps to stop the reactor water level increase. Water level increased to within approximately six inches of the Main Steam Lines. At that point, the manual isolation valve in the reactor feed pump bypass flow path was closed and level began decreasing. Reactor water level then returned to normal. Bypass throttle valve 1FW003A was subsequently repaired in accordance with Maintenance Work Request D13973 and is awaiting post maintenance testing (PMT). This PMT is scheduled to be completed prior to the end of the planned maintenance outage (PO-3) currently in progress. PO-3 is scheduled to be completed by March 27, 1990.

At 2134 hours on February 13, 1990, the plant entered Mode 4 (COLD SHUTDOWN).

No other 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.

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CAUSE OF EVENT

Investigation determined that penetration 1MC-102 apparently failed its LLRT because of seat leakage on valve 1VQ004B. This seat leakage was caused by a large amount of dirt or atmospheric dust trapped between the seal [SEAL] and the valve disk sealing surface. The entire surface of the valve had a large amount of dirt build-up because Cosmolene, a sticky preservative, had not been removed prior to initial installation of the valve. Stroking the valve on a quarterly basis in accordance with Technical Specifications allowed the surface dirt to accumulate on the sealing surfaces of the valve resulting in the seat leakage. No accumulation of dirt was noted in the system piping or on 1VQ004A. Therefore, the root cause of the LLRT failure and subsequent shutdown of the reactor is attributed to the failure to remove the preservative from valve 1VQ004B prior to its initial installation during construction.

CORRECTIVE ACTION

Valves 1VQ004A and 1VQ004B were replaced in accordance with Maintenance Work Request (MWR) D12948. The replacement valves were verified to have no foreign substances on their surfaces. An LLRT will be performed on penetration 1MC-102 prior to the end of PO-3.

A search to identify other valves similar to 1VQ004A and 1VQ004B which are subject to local leak rate testing, identified only two other valves of the same type, 36-inch diameter Posi-Seal butterfly valves. These valves, 1VR001A and 1VR001B, Containment Building ventilation supply outboard and inboard containment isolation valves, are located at containment penetration 1MC-101 and have the same quarterly stroke-time test, LLRT, and Technical Specification requirements as 1VQ004A and 1VQ004B.

A review of maintenance and testing history for valves 1VQ004A, 1VQ004B, 1VR001A, and 1VR001B was performed. The review did not identify any LLRT failures since initial plant operation due to seat leakage, however, valves 1VR001B and 1VQ004A failed their initial LLRT prior to plant startup. These valves were cleaned and reworked prior to initial plant operation. Since 1VR001B was cleaned and reworked after initial installation and 1VQ004A and 1VQ004B have been replaced, valve 1VR001A is the only valve of the four that may still be coated with a preservative. For this reason, MWR D15012 has been initiated to remove, inspect, and clean valve 1VR001A prior to the end of PO-3.

Clinton Power Station has procedures in place to ensure system cleanliness is maintained during maintenance and modifications, evolutions performed during system operation, and system lay-up. These procedures were not applicable during the construction period when the valves were installed, however, they should prevent the occurrence of a similar event in the future.

Valves 1VQ004A, 1VQ004B, 1VR001A and 1VR001B have never been used during plant operation in Modes 1 and 2 and are seldom used during plant operation in Mode 3. These valves are stroke-time tested on a quarterly basis only to meet Inservice Inspection (ISI) testing requirements. Therefore, to further reduce the possibility of an LLRT failure during power operations, these valves may, at the discretion of the Shift Supervisor, be tagged shut and declared out-of-service when the plant is operating in Modes 1, 2 and 3. With the valves out-of-service, the ISI stroke-time test requirement can be waived in accordance with American Society of Mechanical Engineers (ASME) Code Section XI, Article IWV-3416. This will reduce the possibility of future LLRT failures by reducing the possibility of dirt accumulating on the sealing surfaces of the valves. An LLRT will be performed on containment penetrations 1MC-101 and 1MC-102 and the valves of these penetrations will be tagged shut, prior to the end of PO-3. Additionally, IP will continue to perform quarterly LLRTs on these penetrations in accordance with Technical Specification surveillance requirements.

ANALYSIS OF EVENT

This event is reportable under the provisions of 10CFR50.73(a)(2)(i) because of the completion of a nuclear plant shutdown required by Technical Specification 3.6.1.1.

Illinois Power (IP) is performing an assessment to assure that this event did not affect Clinton Power Station's capability to limit the release of fission products to the station site environs following an accident so that offsite doses would not have exceeded the values specified in Title 10, Code of Federal Regulations, Part 100, thus ensuring that this event was not safety significant. If the assessment determines that 10CFR100 limits could have been exceeded, IP will provide a supplemental report including that information.

Penetration 1MC-102 was considered inoperable at 1630 hours on February 12, 1990, and is scheduled to be restored prior to startup from PO-3.

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ADDITIONAL INFORMATION

Valve 1VQ004B is a thirty-six inch diameter butterfly valve, model number 1144 manufactured by POSI-SEAL.

CPS has not previously reported any LLRT failures caused by failure to remove preservatives from a valve. However, LERs 87-062-00, 88-008-00, and 89-001-00 reported failures of Main Steam Isolation Valves to meet LLRT requirements because of component wear based on the service the valves had seen.

For further information regarding this event, contact R. W. Morgenstern, Director-Plant Technical at (217) 935-8881, extension 3210.