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Wilfred Connell  
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U-602684  
2C.220

WC-034-97  
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Docket No. 50-461

10CFR50.73

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

Subject: Clinton Power Station - Unit 1  
Licensee Event Report No. 96-020-00

Dear Madam or Sir:

Enclosed is Licensee Event Report (LER) No. 96-020-00: Failure of Control Rod Drive Hydraulic Control Unit Air Line Due to Overtightening Fitting During Maintenance to Correct Air Leak Results in Scram Discharge Volume High Water Level Trip Signal and Automatic Scram. This report is being submitted in accordance with the requirements of 10CFR50.73.

Sincerely yours,

Wilfred Connell  
Vice President

RSF/krk

Enclosure

030037

cc: NRC Clinton Licensing Project Manager  
NRC Resident Office, V-690  
Regional Administrator, Region III, USNRC  
Illinois Department of Nuclear Safety  
INPO Records Center

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## LICENSEE EVENT REPORT (LER)

(See reverse for required number of  
digits/characters for each block)ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY  
INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS  
LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK  
TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE  
INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S.  
NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20565-0001, AND  
TO THE PAPERWORK REDUCTION PROJECT (3160-0104), OFFICE OF  
MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)

Clinton Power Station

DOCKET NUMBER (2)

05000461

PAGE (3)

1 OF 3

TITLE (4)

Failure of Control Rod Drive Hydraulic Control Unit Air Line Due to Overtightening Fitting During Maintenance to Correct Air Leak  
Results in Scram Discharge Volume High Water Level Trip Signal and Automatic Scram

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 NAME	DOCKET NUMBER
12	23	96	96	020	00	01	20	97	None	05000
									None	05000
OPERATING MODE (9)			THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more) (11)							
5			20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(viii)	
POWER LEVEL (10)			20.2203(a)(1)		20.2203(a)(3)(i)		50.73(a)(2)(ii)		50.73(a)(2)(x)	
000			20.2203(a)(2)(i)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71	
			20.2203(a)(2)(ii)		20.2203(a)(4)		X 50.73(a)(2)(iv)		OTHER	
			20.2203(a)(2)(iii)		50.36(c)(1)		50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A	
			20.2203(e)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)			

## LICENSEE CONTACT FOR THIS LER (12)

NAME

R. A. Matthews, Project Engineer

TELEPHONE NUMBER (Include Area Code)

(217) 935-8881, Extension 3188

## 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
X	AA	TBG	X999	N					

## 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 15 single-spaced typewritten lines) (16)

The plant was in REFUELING, all control rods were fully inserted in the reactor core, and the reactor mode switch was locked in the shutdown position. A maintenance repairman was preparing to repair an air leak on a control rod drive hydraulic control unit (HCU). When the repairman touched the air line, it broke behind the compression fitting. The break caused a loss of instrument air to the scram valve pilot air header. The header depressurized and scram inlet and outlet valves opened and the scram discharge volume (SDV) vent and drain valves closed. The SDV filled with reactor water causing a SDV high water level trip signal and an automatic actuation of the Reactor Protection System. The cause of this event is attributed to equipment failure due to overtightening the compression fitting until the tubing was thinned to the point that the tubing broke when a small force was applied to it. Corrective action includes repairing the broken air line, evaluating the material condition of other HCU air lines and replacing tubing and fittings as necessary.

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

## DESCRIPTION OF EVENT

On December 23, 1996, the plant was in Mode 5 (REFUELING). Reactor [RCT] coolant temperature was being maintained between 75 and 85 degrees Fahrenheit (F) and pressure was atmospheric. The sixth refueling outage (RF-6) was in progress. All reactor control rods were fully inserted in the reactor core and reactor mode switch [HS] was locked in the shutdown position.

A mechanical maintenance repairman was preparing to repair an air leak on a control rod drive (CRD) system [AA] hydraulic control unit [HCU] in accordance with maintenance work request (MWR) D61669. MWR D61669 is a generic work document for investigating and repairing air leaks on HCUs.

At about 1843 hours, the repairman touched the air line [TBG] for HCU 44-49 to begin repairing the air leak, and the air line broke behind the compression fitting at the interface between the forward ferrule and the back ferrule. In the main control room, operators received an alarm indicating low scram air header pressure. The repairman immediately notified the main control room that the HCU tubing had broken.

The break in the air line caused a loss of instrument air [LE] to the CRD system scram pilot valve [V] air header. When the air header depressurized, the scram inlet and outlet valves opened and the scram discharge volume (SDV) vent and drain valves closed per design. With the SDV vent and drain valves closed, the SDV filled with reactor water causing a SDV high water level trip signal and an automatic actuation of the Reactor Protection System (RPS) [JC].

No control rods moved as a result of the RPS actuation. The Operations shift supervisor was immediately notified of the actuation and he directed that other HCU air lines be evaluated for the potential of a similar failure occurring. Condition Report 1-96-12-218 was initiated to track a cause and corrective action determination.

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

## CAUSE OF EVENT

The cause of this event is attributed to equipment failure due to overtightening the compression fitting until the tubing was thinned to the point that the tubing broke when a small force was applied to it. Illinois Power suspects that to stop previous air leaks, the fitting was tightened and re-tightened over the years to the extent that the tube was weakened at the back ferrule to forward ferrule interface. The tubing thinned due to the fitting being overtightened and eventually thinned sufficiently to shear off when the repairman applied pressure on the tube by touching it.

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

## CORRECTIVE ACTION

The broken air line was repaired in accordance with MWR D61659 and the RPS actuation signal was reset at 1935 hours on December 23, 1996.

The material condition of other HCU air lines will be evaluated and tubing and fittings will be replaced as necessary in accordance with condition report 1-96-12-218 and MWR D77699.

## ANALYSIS OF EVENT

This event is reportable under the provisions of 10CFR50.73(a)(2)(iv) due to the automatic actuation of the Reactor Protection System.

An assessment of the safety consequences and implications of this event identified that this event was not nuclear safety significant for existing plant conditions or other plant modes or power levels. At the time the event occurred, all control rods were already fully inserted and the plant was in a safe and stable condition. The RPS actuation ensured the plant remained in a safe and stable condition.

The RPS actuation initiated due to the SDV high water level signal is a plant designed response. The CRD and RPS systems responded as designed to the loss of instrument air. The capability of the plant to perform its intended safety functions and achieve and maintain a safe shutdown was not affected by this event.

In addition, events resulting from the loss of the instrument air system have been analyzed in Chapter 15 of the Updated Safety Analysis Report (USAR). The analysis determined that the transients resulting from the loss of the instrument air system are within the limits of plant design. The event described in this LER is bounded by the USAR analysis.

## ADDITIONAL INFORMATION

The air line that failed is 0.375-inch inside diameter and 0.5-inch outside diameter ASTM B88-54 non-safety-related copper tubing. The manufacturer of the copper tubing has not been identified. The compression fitting involved in this event was a Swagelok 0.5-inch tube by 0.5-inch MNPT, brass fitting.

Clinton Power Station has not reported automatic actuations of the Reactor Protection System due to loss of instrument air in recent history.

For further information regarding this event, contact R. A. Matthews, Project Engineer, at (217) 935-8881, extension 3188.