LICENSEE EVENT REPORT (LER)

Facility Name (1)	Docket Number (2)	Page (3)
Byron, Unit 1	0 5 0 0 0 4 5 4	1 of 0 3

Title (4) FAILURE OF THE 1B RESIDUAL HEAT REMOVAL PUMP DUE TO HIGH VIBRATION

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 7	2 4	8 5	8 5	---	0 7 0	0 1	0 2	0 6	8 6	NONE	0 5 0 0 0
											0 5 0 0 0

OPERATING MODE (9)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR (Check one or more of the following) (11)			
1	___ 20.402(b)	___ 20.405(c)	___ 50.73(a)(2)(iv)	___ 73.71(b)
POWER LEVEL (10) 1 0 0	___ 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)
	___ 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
Marseyne Snow, Assistant Compliance Supervisor Ext. 2679	AREA CODE 8 1 5 2 3 4 - 5 4 4 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	B P	P	1 0 7 5	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 July 24, 1985 at approximately 2230 hours, during the performance of the ASME Quarterly Surveillance test for the Train B Residual Heat Removal [BP] (RH) Pump (1RH01PB), vibration readings for the pump's upper motor bearing exceeded the acceptance criteria limits. The applicable Technical Specification Action Requirement was to repair the pump within 72 hours or be in Hot Standby in 6 hours and Hot Shutdown in the following 6 hours. Attempts were initiated within the initial 72 hour period to restore the RH pump to service. When it became apparent that the pump would not be restored, the station opted to achieve Hot Standby by conducting a start up test that required a plant trip from the existing power level. The Reactor Coolant System (RCS) was maintained at 360°F to expedite the return to power until the duration of repairs mandated entry into Hot Shutdown (RCS temperature less than or equal to 350°F).

The principal cause of the failure was motor vibration inducing excessive forces on the motor runner due to the cantilever effect of the motor. Modification M6-1-85-0556, to minimize the cantilever action of the pump/motor assembly, has been initiated and approval for installation was granted on 2/3/86.

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A. PLANT CONDITIONS PRIOR TO EVENT:

MODE 1 - Power Operation Rx Power 100% RCS [AB] Temperature/Pressure Normal Operating

B. DESCRIPTION OF EVENT:

On July 24, 1985, at approximately 2230 hours, during the performance of the ASME Quarterly Surveillance Test for the Train B Residual Heat Removal [BP] (RH) Pump (1RH01PB), vibration readings taken at the pump's upper motor bearing exceeded the acceptance criteria limits. At the time, the plant was at 100% power and all support systems were operable. The applicable Technical Specification Action Requirement was to repair the pump within 72 hours or be in Hot Standby in 6 hours and Hot Shutdown in the following 6 hours. Attempts were initiated within the initial 72 hour period to restore the RH pump to service. When it became apparent that the pump would not be restored, the station opted to achieve Hot Standby by conducting a start up test that required a plant trip from the existing power level. The Reactor Coolant System (RCS) was maintained at 360°F to expedite the return to power until the duration of repairs mandated entry into Hot Shutdown (RCS temperature less than or equal to 350°F). The plant was placed in Hot Standby at 2001 on July 27, 1985 and Hot Shutdown at 1025 on July 28, 1985.

The pump was then repaired, tested persuant to the requirements of ASME Section XI, Subsection IWP, and returned to service on 7/31/85.

This is reportable per the requirements of 10CFR50.73(a)(2)(i).

C. CAUSE OF EVENT:

An imbalance in the motor was putting excessive pressure on the lower motor runner, causing it to wear unevenly. This effect is magnified due to the cantilever beam configuration of the vertical pumps. In addition to this, upon motor disassembly, the following discrepancies were identified:

1. Nail in the motor windings
2. Out of tolerance between the upper motor bearing runner and the shaft.

The failure mode was degradation of plant equipment. The performance parameters of the pump and the system were not affected.

D. SAFETY ANALYSIS:

Although a relatively high vibration condition existed, the pump was able to satisfy or exceed the flow and differential pressure parameters of the surveillance. Thus, the operating condition of the pump was not degraded and it would have been able to perform its safety function had it been challenged. In the most limiting case, that of gross pump failure due to extended use with high vibration, the redundant 'A' RH pump would have satisfied decay heat removal requirements.

E. CORRECTIVE ACTIONS:

To correct these conditions, the nail was removed, the rotor and shaft balanced, and finally, a new bearing runner was fabricated to as close a fit as possible to the shaft. The surveillance was then reperformed and successfully completed. Project Engineering and Westinghouse have concluded that the bearing damage is accelerated by the cantilever action of the pump/motor assembly. A modification (6-1-85-0556) to install anti-vibration struts on the upper motor housing has been initiated. The tolerances on the struts will be on the order of 0.001 inches to minimize the cantilever effect. Approval for installation of the struts was obtained on 2/3/86. Action Item Record (AIR) 6-86-031 tracks completion of the strut modification. The ASME Quarterly Surveillance will continue to monitor pump characteristics and vibration levels in the interim.

F. PREVIOUS OCCURRENCES:

LER NUMBER	TITLE
NONE	

G. COMPONENT FAILURE DATA:

MANUFACTURER	NOMENCLATURE	MODEL NUMBER	MFG PART NUMBER
Ingersoll-Rand	Lower Motor Runner	8X20WDF	

Commonwealth Edison
Byron Nuclear Station
4450 North German Church Road
Byron, Illinois 61010

February 6, 1986

LTR: BYRON 86-0114

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

Dear Sir:

The enclosed Licensee Event Report from Byron Generating Station is being transmitted to you as a Supplemental Report to LER 85-070-00.

This report is number 85-070-01; Docket No. 50-454.

Very truly yours,

R. E. Querio
Station Manager
Byron Nuclear Power Station

REQ/bf

Enclosure: Licensee Event Report No. 85-070-01

cc: J. G. Keppler, NRC Region III Administrator
J. Hinds, NRC Resident Inspector
INPO Record Center
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