CENTRAL FILES

JUL 26 1978

Docket No. 50-331

Iowa Electric Light and Power Company
ATTN: Mr. Duane Arnold
President
IE Towers
P. O. Box 351
Cedar Rapids, IA 52406

Gentlemen:

The enclosed IE Circular No. 78-16 is forwarded to you for information. If there are any questions related to your understanding of the suggested actions, please contact this office.

Sincerely,

James G. Keppler
Director

Enclosures:
1. IE Circular No. 78-16
2. List of IE Circulars Issued in 1978

cc w/encls:
Mr. E. L. Hammond,
Chief Engineer
Central Files
Director, NRR/DPM
Director, NRR/DOR
PDR
Local PDR
NSIC
TIC

Ao 2
GD

OFFICE ▶	RIII	RIII				
SURNAME ▶	Fiorelli/dal	Keppler				
DATE ▶	7-26-78	7-26-78				

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION III

July 26, 1978

IE Circular No. 78-16

LIMITORQUE VALVE ACTUATORS

Description of Circumstances:

At Rancho Seco, a Limitorque Type SMB-2 motor-driven valve actuator in a safety feature system failed to function. The failure resulted from clutch wear which was due to manual operation of the valve and improper heat treatment of the clutch parts. Other SMB valve actuators at Rancho Seco had been subjected to undue clutch wear but were still operable. Based on information obtained from the licensee and from Limitorque Corporation, undue wear appears to be limited to Type SMB-0, 1, 2, and 3 valve actuators equipped with 3600 rpm motors.

The type SMB valve actuator is provided with a handwheel so that the valve can be actuated manually in the event that power is unavailable. To shift from motor drive to handwheel drive, the operator must manually position a clutch so that the motor is disengaged from the drive train and the handwheel is engaged. The clutch latches into this position and cannot be manually repositioned. The next time that the motor is energized, the latch releases automatically and a spring repositions the clutch so that the motor engages the drive train.

When the clutch is repositioned, a pair of lugs on the motor-side of the clutch engages a pair of lugs on the valve-side. At the instant the lugs engage, the lugs on the motor-side are being accelerated to full speed and the lugs on the valve-side are stationary. Before the motor is energized, the relative position of the lugs is random. This initial position determines the depth of engagement or bite at the instant the lugs make contact. When a full bite occurs, no damage is caused to the lugs. When a grazing bite occurs, the edges of the lugs are chipped or upset. After the edges are sufficiently rounded, the clutch will not engage and hold for motor actuation.

The licensee estimated that the failure of the Type SMB-2 valve actuator occurred after it had been clutched 25 to 100 times. The valve which failed to function at Rancho Seco (SFV-25003) is operated by the actuator and is a safety features valve in a line connecting the borated water storage tank to a high pressure safety injection pump and a decay heat removal (low head safety injection) pump. The valve actuator is wired so that the valve which it controls will drive to the fully open or fully closed position once the motor is energized.

SFV-25003 is used for various routine operations during refueling, e.g. adding borated water to the primary cooling system. In these instances, the operator uses SFV-25003 as a throttle valve. To do this, the valve must be actuated manually, giving rise to the potential damage to the lugs as described above. This would not occur with the type of valve actuator that is clutched with the motor at rest. Likewise, a separate throttle valve for supplying borated water during routine operation would preclude the need for manual operation of the subject valve actuator.

Limitorque Corporation has a test program in progress for determining the clutch life of Type SMB 0, 1, 2, and 3 valve actuators. Results to date are inconclusive. Pending other resolution of the problem, the licensee has stated that the valve will be stroked with the motor drive to ensure that the clutch has engaged the motor following manual actuation of the valve.

All licensee and construction permit holders should consider:

For Limitorque Type SMB-0, 1, 2, and 3 valve actuators with 3600 rpm motors which are used or will be used in engineered safety systems;

1) The potential for failure of the actuators resulting from manual operation,

2) Means for minimizing manual operation and,

3) Procedures for verifying that the actuator is operable with the motor after manual operation.

No written response to this Circular is required. If you require additional information regarding this matter, contact the Director of the appropriate NRC Regional Office.

LISTING OF IE CIRCULARS ISSUED IN 1978

Circular No.	Subject	Date of Issue	Issued To
78-01	Loss of Well Logging Source	4/5/78	All Holders of Well Logging Source Licenses
78-02	Proper Lubricating Oil for Terry Turbines	4/20/78	All Holders of Reactor OLs or CPs
78-03	Packaging Greater Than Type A Quantities of Low Specific Activity Radioactive Material for Transport	5/12/78	All Holders of Reactor OLs, CPs, Fuel Cycle, Priority I Material and Waste Disposal Licenses
78-04	Installation Error That Could Prevent Closing of Fire Doors	5/15/78	All Holders of Reactor OLs or CPs
78-05	Inadvertent Safety Injection During Cooldown	5/23/78	All Holders of Reactor OLs or CPs
78-06	Potential Common Mode Flooding of ECCS Equipment Rooms at BWR Facilities	5/23/78	All Holders of Reactor OLs or CPs
78-07	Damaged Components of a Bergen-Paterson Series 25000 Hydraulic Test Stand	5/31/78	All Holders of Reactor OLs or CPs
78-08	Environmental Qualification of Safety Related Equipment at Nuclear Power Plants	5/31/78	All Holders of Reactor OLs or CPs
78-09	Arcing of General Electric Company Size 2 Contactors	6/5/78	All Holders of CPs

LISTING OF IE CIRCULARS ISSUED IN 1978

Circular No.	Subject	Date of Issue	Issued to
78-10	Control of Sealed Sources Used in Radiation Therapy	6/14/78	All Medical Licensees in Categories G and G1
78-11	Recirculation M-G Set Overspeed Stops	6/15/78	All Holders of BWR OLs or CPs
78-12	HPCI Turbine Control Valve Lift Rod Bending	6/30/78	All Holders of BWR OLs or CPs for plants with HPCI Terry Turbine
78-13	Inoperability of Multiple Service Water Pumps	7/10/78	All Holders of Reactor OLs and CPs except for plants located in: AL, AK, CA, FL, GA, LA, MS, SC
78-14	HPCI Turbine Reversing Chamber Hold Down Bolting	7/12/78	All Holders of BWR OLs or CPs for plants with a HPCI Terry Turbine excepting Duane Arnold and Monticello
78-15	Checkvalves Fail to Close In Vertical Position	7/20/78	All Holders of Reactor OLs or CPs