

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

March 14, 1980

IE Circular No. 80-04

SECURING OF THREADED LOCKING DEVICES ON SAFETY-RELATED EQUIPMENT

Description of Circumstances:

In recent months, several licensee event reports have been submitted that address the inoperability of safety-related equipment caused by loosened threaded locking devices. Some of the events are listed below:

I. MAIN STEAM CHECK VALVE HEX NUT LOCKING DEVICES, TURKEY POINT NO. 3
REPORTABLE OCCURRENCE 250-79-31 (Oct. 22, 1979)

During a planned outage of Turkey Point Unit No. 3 on October 7, 1979, a two-inch internal diameter hex nut was discovered in the internals of a steam supply valve for a moisture separator-reheater. Investigation revealed that the nut was missing from the disc stud of the 3A main steam check valve. The disc and disc stud were in the proper position and the valve was fully operable. The 3B and 3C main steam check valves were inspected and the disc stud, nut and locking washer were in place although some distress was noted on the 3C locking washer in that the tack welds on the locking pin had separated.

The licensee installed an improved locking device on the disc stud on each of the three main steam check valves. The locking device consists of a tab washer that is prevented from rotating by a pin and by fingers that extended on either side of the valve arm; the tabs are bent up against two faces of the hex nut. The main steam isolation valves (MSIV) have the same type of hex nut locking device. The valves are Schutte and Koerting SK Type 828.

II. SLIPPAGE AND MISALIGNMENT OF VALVE LINKAGES, DAVIS-BESSE LICENSEE EVENT
REPORT NOS 78-101 (Nov. 1, 1978), 78-126 (Jan. 26, 1979), 79-068 (July 19, 1979), and 79-098 (Oct. 30, 1979)

These reports involve the inoperability of two service water system valves and one component cooling water system valve. The valves were declared inoperable because the nut on the actuator linkage was either missing or had loosened to the point where there was slippage and misalignment of the valve linkage. These valves were provided by Hammel-Dahl. The supplier has provided the licensee with an addendum to the instruction manual that defines the torque requirements for the cap screw that is used to retain the actuator link arm to the valve disc arm.

III. ECCS SUBSYSTEM INOPERABLE - NO. 12 SAFETY INJECTION PUMP IMPELLER LOCKNUTS LOOSE, SALEM NO. 1 LICENSEE EVENT REPORT NO. 79-68 (Dec. 20, 1979).

The AC supply breaker tripped when No. 12 Safety Injection (SI) Pump was started to fill the accumulators on October 18, 1979. When the rotor could not be turned by hand, the upper casing was removed for an inspection of the pump internals. The radial and thrust locknuts were found loosened to the extent that they could be removed by hand. The impeller spacer sleeves were worn and the impeller shaft was slightly bent. The pump was reworked, tested and returned to service on November 2, 1979.

The locknuts on the three other Unit 1 and Unit 2 Safety Injection (SI) Pumps were inspected and two pump impeller locknuts were found loose, and one pump impeller locknut was found secured with setscrews that had been installed by mistake at the manufacturing facility and the impeller was sent back to the manufacturer for rework. The locknuts on all of the SI pumps were secured using Locktite compound per Public Service Engineering Department recommendation and the pump manufacturer's concurrence. The pumps are horizontal, centrifugal, ten stage units manufactured by Pacific Pumps, Inc.

IV. TARGET ROCK MOTOR OPERATED GLOBE VALVES - BUSHING NOT STAKED, ANO NO. 2 LICENSEE EVENT REPORT 79-93 (FEB. 14, 1980)

While investigating the failure of a High Pressure Safety Injection (HPSI) header shut-off valve at Arkansas Nuclear One, Unit 2, the threaded bushing was found loose. The bushing was not staked or otherwise secured to prevent movement. This bushing is part of the mechanism which converts the valve stem rotation to linear travel of the disk. The full open limit switch is gear driven by the valve operator and movement of the bushing can alter the relationship between stem rotation and linear travel such that valve travel in the open direction may be terminated prematurely by the limit switch. The HPSI header shut-off valves at ANO-2 are Target Rock 2-inch 1500# ANSI Motor Operated Globe Valves. Arkansas Power & Light found that a similar problem exists with the Low Pressure Safety Injection (LPSI) header shut-off valves which are Target Rock 6-inch 1500# ANSI Motor Operated Globe Valves. Target Rock has provided Arkansas Power & Light Company with a procedure for staking the bushing nuts.

V. OTHER EVENTS

Loose locking devices were also identified in one of the I & E Bulletins and two of the I & E Circulars issued in 1979: IE Circular 79-04 Loose Locking Nut on Limitorque Valve Operators, IE Circular 79-19 Loose Locking Devices on Ingersoll-Rand Pumps, IE Bulletin 79-15 Deep Draft Pumps.

Recommended Action for Licensees Consideration:

It is recommended that licensees of operating power reactors and holders of construction permits review the specific items presented in the "Description of Circumstances" for applicability at their facilities and review their installation and maintenance procedures to determine that whether securing of locking devices has been addressed in these procedures. It is further recommended that installation and maintenance procedures for all safety-related components be reviewed to be sure the securing of locking devices is adequately covered.

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

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Enclosure

RECENTLY ISSUED
IE CIRCULARS

Circular No.	Subject	Date of Issue	Issued to
80-03	Protection from Toxic Gas Hazards	3/6/80	All holders of a power reactor OL
80-02	Nuclear Power Plant Staff Work Hours	2/1/80	All holders of Reactor OLs, including research and test reactors, and CPs
80-01	Service Advice for GE Induction Disc Relays	1/17/80	All licensees of nuclear power reactor operating facilities and holders of nuclear power reactor CPs
79-25	Shock Arrestor Strut Assembly Interference	12/20/79	All licensees and holders of power reactor CPs
79-24	Proper Installation and Calibration of Core Spray Pipe Break Detection Equipment on BWRs.	11/26/79	All Holders of a Power Reactor OL or CP
79-23	Motor Starters and Contactors Failed to Operate	11/26/79	All Power Reactor Operating Facilities and Holders of Reactor CPs
79-22	Stroke Times for Power Operated Relief Valves	11/16/79	All Power Reactor Operating Facilities and all Utilities having a CP
79-21	Prevention of Unplanned Releases of Radioactivity	10/19/79	All holders of Power Reactor OLs and CPs
79-20	Failure of GTE Sylvania Relay, Type PM Bulletin 7305, Catalog 5U12-11-AC with a 12V AC Coil	9/24/79	All holders of Power Reactor OLs and CPs
79-19	Loose Locking Devices on Ingersoll-Rand Pumps	9/13/79	All Holders of Power Reactor OLs and CPs