

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, D.C. 20555

October 20, 1988

NRC INFORMATION NOTICE NO. 88-84: DEFECTIVE MOTOR SHAFT KEYS IN LIMITORQUE
MOTOR ACTUATORS

Addressees:

All holders of operating licenses or construction permits for nuclear power reactors.

Purpose:

This information notice is being provided to alert recipients to potential problems from defective motor shaft keys installed in certain Limitorque actuators. It is expected that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. However, suggestions contained in this information notice do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

On October 15, 1987, the NRC received a report from Houston Lighting and Power Company concerning sheared motor shaft-to-pinion keys found in a Limitorque actuator at its South Texas Project, Unit 2, nuclear plant. A similar key failure also occurred in April 1987. The sheared key from one of the valves was sent to a metallurgical laboratory which found that the properties of the material were not consistent with those of American Iron and Steel Institute (AISI) type 1018 steel. AISI type 1018 steel is the material designated by Limitorque for these particular keys as specified in Limitorque design documents.

In August 1987, three additional keys had been removed from similar actuators and sent to the laboratory for analysis. One of the removed keys was split and the other two showed signs of deformation. Laboratory analysis of these keys revealed that the properties of the key material were not consistent with those of AISI type 1018 steel. The metallurgical analysis revealed that the keys had failed longitudinally along manganese sulfide inclusions and that the key material was probably an AISI type 1118 or 1119 resulfurized steel. Additionally, on March 16, 1983, Westinghouse had submitted a 10 CFR Part 21 report to the NRC concerning its discovery of sheared keys on six actuators. These keys were also analyzed and found to be made of other than AISI type 1018 steel.

Discussion:

During an NRC inspection at Limitorque in May 1988, inspectors found that at the time of the manufacture of the South Texas actuators, keys were purchased

8810140018

881020


PDR I & E Notice 88-084

from a commercial vendor without certificates of conformance for the material type or properties. No checks were performed at Limitorque to verify that the proper key material was received. Keys purchased today are still bought as commercial grade; however, certified material test reports (CMTRs) are received from the vendor. Limitorque also performs hardness and dimensional checks of the keys upon receipt from the vendor.

In a letter to the NRC dated May 19, 1988, Limitorque provided additional information on this issue. Limitorque stated that the current material control procedures for key procurement were fully implemented in September 1983. At that time, the existing key inventory was scrapped and completely replaced with keys purchased under the new controls. It is estimated that all actuators from serial number 362735 onward were supplied with keys procured under the upgraded material controls. Additionally, Limitorque determined that only the following actuator-motor combinations could potentially experience similar key failures due to improper material.

<u>Unit Size</u>	<u>Motor Size</u>
SMB-000	None
SMB-00	25-ft.1b 1800 rpm
SMB-0	25-ft.1b 1800 rpm 25-ft.1b 3600 rpm 40-ft.1b 1800 rpm
SMB-1	60-ft.1b 1800 rpm 60-ft.1b 3600 rpm
SMB-2	80-ft.1b 3600 rpm

No specific action or written response is required by this information notice. If you have any questions about this matter, please contact the technical contact listed below or the Regional Administrator of the appropriate regional office.


Charles E. Rossi, Director
Division of Operational Events Assessment
Office of Nuclear Reactor Regulation

Technical Contact: Jeffrey B. Jacobson, NRR
(301) 492-0996

Attachment: List of Recently Issued NRC Information Notices

LIST OF RECENTLY ISSUED
NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
88-83	Inadequate Testing of Relay Contacts in Safety-Related Logic Systems	10/19/88	All holders of OLs or CPs for nuclear power reactors.
88-82	Torus Shells with Corrosion and Degraded Coatings in BWR Containments	10/14/88	All holders of OLs or CPs for BWRs.
88-81	Failure of Amp Window Indent Kynar Splices and Thomas and Betts Nylon Wire Caps During Environmental Quali- fication Testing	10/7/88	All holders of OLs or CPs for nuclear power, test, and research reactors.
88-80	Unexpected Piping Movement Attributed to Thermal Stratification	10/7/88	All holders of OLs or CPs for PWRs.
88-79	Misuse of Flashing Lights for High Radiation Area Controls	10/7/88	All holders of OLs or CPs for nuclear power reactors.
88-69, Supp 1	Movable Contact Finger Binding in HFA Relays Manufactured by General Electric (GE)	9/29/88	All holders of OLs or CPs for nuclear power reactors.
88-78	Implementation of Revised NRC-Administered Requali- fication Examinations	9/22/88	All holders of OLs or CPs for nuclear power reactors.
88-77	Inadvertent Reactor Vessel Overfill	9/22/88	All holders of OLs or CPs for BWRs.
88-76	Recent Discovery of a Phenomenon not Previously Considered in the Design of Secondary Containment Pressure Control	9/19/88	All holders of OLs or CPs for nuclear power reactors.

OL = Operating License
CP = Construction Permit