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GBS015-087

March 24, 1987

U. S. Nuclear Regulatory Commission
Office of Inspection and Enforcement
Washington, D. C. 20555

Attention: J. E. Rosenthal


Gentlemen:

GE ECCS PUMP

SUBJECT: TELECON-GERMANE TO SAFETY - MOTOR BRACKET
AND FELT BLOCKING FATIGUE FAILURE

Please find the attached memo of telecon to you of March 24, 1987. The telecon provided information on motor brackets which had broken and cracked felt blocking in motors.

Very truly yours,


G. B. Stramback, Manager
Safety Evaluation Programs

GBS/dc

Attachment

cc: L. S. Gifford (GE-Beth)

SEARCH

TO: JIM STONE, VPR
CC: ERIC WEISS, EAB

JEN

IE20

87-067

MEMO OF TELECON

DATE: March 24, 1987 GBS-016-087
TIME: 8:30 AM
PERSON CALLING: J. E. ROSENTHAL (NRC-I&E, 301-492-4193)
SUBJECT: MOTOR BRACKET AND FELT BLOCKING

Jack Rosenthal was called in order to inform the NRC of a condition determined to be not reportable but considered to be Germane-to-Safety. This conclusion is based upon GE Nuclear Energy Business Operation (NEBO) completing its evaluation as to reportability under 10CFR Part 21.

During a routine motor inspection in a BWR 4 in November 1986, a fatigue failure was found in the end-turn support brackets and cracking was found in felt end-turn blocking in some of the Residual Heat Removal (RHR) and Core Spray (CS) pump motors.

The end-turn support brackets and the felt blocking are parts of the end-turn design configuration, which supports the end-turn assembly inside the motor. Stabilizing the end-turns is seen as a desirable attribute of a given motor design although some motor designs do not have this feature. The individual contribution of the felt blocking and the support brackets to the support or stabilization of the end-turn assemblies, however, is not known.

Inspections of the RHR and CS motors at the BWR 4 were performed to determine the extent and nature of the deficiencies in the felt blocking and end-turn support brackets. The results of these inspections showed lower bracket failures in 5 of 6 motors. Modified end-turn support brackets were installed in the motors at the BWR 4, and a test was performed. The test results showed that significant cyclic loading is caused by starting but not by normal operational loading. A smooth bend radius used on the modified brackets for the motors was judged to provide adequate design life given cyclic loading found in the test.

All domestic BWR plants and eleven foreign plants have similar ECCS motors to those under discussion and are being notified of this same information.

Basis

NEBO has concluded that these motors, with broken brackets and cracked felt blocking, do not represent a substantial safety hazard.

The data from the motors at the BWR 4 and the information obtained about other motor failures substantiates this assumption by the absence of a common failure mode. Taken in context with the significant number of

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motor starts at the BWR 4 without failure, and the fact that similar motors have been in operation at many other BWRs for tens of years without motor failure attributable to these deficiencies, and that these other plant motors represent significant additional statistical motor starts, leads to the conclusion that bracket failure is only a potential influence on future performance of the motors. This failure is further reduced in safety significance because failures in safety equipment occur on a random basis and therefore represent the single failure for which the plant design is tolerant.

Therefore, the ECCS motors of similar design are not considered to represent imminent failure potential or a substantial safety risk.

Corrective Actions and Preventive Measures

Utilities are being made aware of the need for more frequent inspection and possible restoration of the motor end-turn assemblies, and the reinstallation of brackets at plants where they may have been removed. The equipment affected by these conclusions and recommendations are the Emergency Core Cooling Systems pump motors, that is, Residual Heat Removal (RHR), Core Spray (CS), and High Pressure Core Spray (HPCS, BWR5 and BWR6 only) systems. The purpose of these inspections and restorations is to assure that the qualification basis of the motors is maintained.

At all plants the end-turn support brackets should be inspected on an annual basis until favorable experience indicates otherwise. The motor brackets may be inspected without disassembling the motors. If broken brackets are found it would be prudent to disassemble, completely inspect and restore the end-turn assemblies as soon as is practical.

The NEBO qualification of these motors recommends a complete disassembly and inspection after ten years of operation regardless of bracket failure.

At plants where it is known that the support brackets have been removed, it is recommended that restoration actions be taken as soon as is practical.

One of the objectives of the inspection and maintenance program is to identify this type of deficiency. No further preventive measures by NEBO are necessary.

→ The NRC is being notified of this information because similar motors may have been supplied to PWRs.