

Westinghouse
Electric Corporation

Water Reactor
Divisions

Nuclear Technology Division

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NS-TMA-2457

June 15, 1981

G. W. Reinmuth, Chief
Vendor and Special Projects Branch
Division of Residence and Regional Reactor Inspection
Office of Inspection and Enforcement
7920 Norfolk Avenue
Washington, D.C. 20015

Dear Sir:

The following summarizes the status to date with regard to the Limitorque Motor Operators.

We have reviewed the Failure Analysis Reports of the Unit 1 and Unit 2 motor failures and witnessed disassembly and inspection of the third unaged motor subjected to HELB testing. The third motor failure tends to isolate the significant effects causing failure to the HELB test. In all cases two (2) failure modes are in evidence; a) bearing seizure and b) insulation abrasion. The insulation abrasion was verified by the third motor test which was terminated prior to failure. The insulation was locally abraded/degraded on the stator winding directly above the inboard motor drain/vent hole only; which is consistent with the Unit 1 and 2 failure locations. Yet again, the bearing operation was rough. A formal report from Reliance on the third motor is scheduled for June 18, 1981. General electrical characteristics of the insulation system and dimensional/material properties of the bearings have been verified and are in accordance with the Limitorque motor design specification. We have also received a certification through Limitorque from Reliance that the motor design and manufacturing has not changed since 1972.

Since problems of this nature have never been encountered in earlier saturated steam tests and the failure analyses indicate the bearings and insulation system meet specification, we have been investigating differences between the two Limitorque test chambers. Limitorque has used their large saturated test chamber successfully since 1970. The super-heat chamber employed for the Westinghouse series of tests was originally constructed as a pilot project to gain experience with the new techniques required for future tests and to identify modifications that needed to be included in a future planned facility. The experimental super-heat

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chamber is a factor of ten(10) smaller than the saturated steam chamber and can barely accommodate an SMB-00 operator. Use of the experimental super-heat chamber for the current tests was a mutual Westinghouse and Limitorque decision in an effort to meet Westinghouse schedular commitments. The significant differences between this smaller super-heat chamber and the one used in earlier tests by Limitorque are 1) size, 2) location of the spray nozzles directly below the steam inlet, 3) high steam flow in excess of 2000 lb/hr, and 4) the absence of steam baffles. All of these factors have added to the severity of the test as compared to the previously employed larger chamber and have resulted in conditions which are clearly more severe than any postulated accident condition.

We have concluded that the current motor design will not pass the conditions specified by Westinghouse for the HELB qualification test in the present Limitorque super-heat chamber. Consequently we are considering the availability of other test facilities that do not have the same chamber geometry/size limitations and can simulate the Westinghouse specified conditions more realistically. In addition, we are considering possible motor modifications that would increase the operators capability to meet the Westinghouse requirements. In the near future we anticipate further testing to verify the effectiveness of some minor modifications being considered to the motor.

We continue to believe that the earlier Limitorque tests, performed in accordance with IEEE Std 382-72 and earlier requirements, continue to be valid references for Westinghouse plants responding to IE Bulletin 79-01B and NUREG 0588. We will keep you informed of further Westinghouse efforts to obtain a successful test of the Limitorque operators to our specified test conditions.

If you have any questions concerning this information, please contact Alex Ball (412-373-5628) or George Butterworth (412-373-5761) of my staff.

Very truly yours,



T. M. Anderson, Manager
Nuclear Safety Department

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