

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

December 28, 1981

Docket No.: 99900902/81-05

Environmental Qualification Program: Westinghouse Screening Test for Reliance
Motor Modifications

Equipment Identification:

Test Specimen(s): Reliance Motors (Modified)

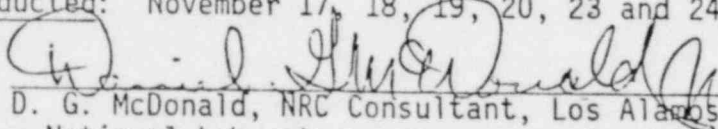
Type: 460V
1800 RFM
Type RH Insulation
Mfg.: Reliance

Test Organization: Wyle Laboratories (Eastern Operations), Scientific Services
and Systems, 7800 Governors Drive West, Huntsville, AL 35807

Contract No.: Westinghouse Electric Corporation, Nuclear Energy Systems, Wyle
Job No. 45787

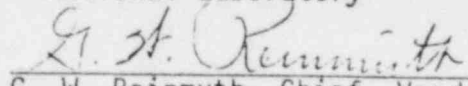
Inspection Conducted: November 17, 18, 19, 20, 23 and 24, 1981,

Staff:


D. G. McDonald, NRC Consultant, Los Alamos
National Laboratory

12/19/81
Date

Approved By:


G. W. Reinmuth, Chief, Vendor and Special
Projects Branch, IE

12/21/81
Date

Summary: The purpose of this inspection was to observe the initial portion of the screening test to assure that it was conducted in accordance with the test procedure. A. R. Johnson, Equipment Qualification and Test Engineer, VIB, RIV and J. Benson, NRC Consultant, Sandia National Laboratories assisted in this inspection.

Results: The review performed during this inspection indicated:

1. The test was conducted in accordance with the test procedure
2. The test specimens functioned as required.
3. The test profile was within it's required limits.
4. The test instruments and equipment functioned as required.
5. The test personnel performed all required actions and accurately documented the data and information.

Details Section
Prepared By: D. G. McDonald

A. Persons Contacted

Earl Campbell - Wyle Test Engineer
Bob McCoy - Wyle Test Engineer
Larry Frazier - Wyle Test Division Director

B. General

During a Westinghouse sponsored environmental qualification program for Limatorque motor operated valve actuators, failures in the motors occurred during the harsh environment (HELB/LOCA) portion of the test program. The motors are manufactured by Reliance Electric. Westinghouse has concentrated on changes to bearings and grease and obtaining information on the effect of steam entry into the motors. Several screening tests were performed on various combinations of bearings and greases. As the result of these tests, Westinghouse selected a replacement bearing and grease combination to be exposed to a harsh environment (HELB/LOCA) screening test prior to subjecting the modified design to a complete qualification program.

Wyle Laboratories developed a detailed test procedure for three (3) Reliance motors with simulated operator assemblies to be used in implementing the Westinghouse screening test requirements.

The purpose of this inspection was to observe the initial portion of the screening test to assure that it was conducted in accordance with the test procedure. The NRC representative accomplished this effort by discussions with Wyle personnel, review of selected documents and records and observing the Wyle test personnel in performing the required actions.

C. Test

1. Objectives

The objectives of this inspection were:

- a. To observe the initiation of the test and assure that it was conducted in accordance with the test procedure.
- b. To observe the facility test personnel in their performance of the test requirements and determine that the data and information was being accurately recorded.
- c. To assure that any anomalies or deviations in the test conditions or test specimen were identified and recorded.

2. Findings

The detailed procedure indicated that three Reliance Motors with simulated operators were to be exposed to the Westinghouse generic HELB/LOCA profile which was included in the procedure. One of the test specimens was a control unit which included the original bearings and grease. The other two test specimens utilized the proposed replacement bearings and grease. In addition, the two modified test specimens had drain modifications. One unit had drain lines external to the test chamber and the other unit had solid drain plugs. The external drain lines were connected to a reservoir to collect any moisture which entered the motor. The test configuration was observed prior to the sealing of the test chamber and was in accordance with the test procedure.

The test chamber temperature, pressure, chemical spray flow and steam flow were instrumented and recorded in accordance with the test procedure. The parameters were all within the limits defined in the procedure for the portion of the test observed during the inspection. Twelve temperature channels were recorded measuring the bearing outer race temperatures.

The test procedure required that readings be taken and recorded at defined intervals for the voltage, power, current per phase, phase to phase resistance and phase to ground resistance. The Wyle test personnel were observed performing and recording the required data. All the measurements were within the expected tolerances.

No anomalies or deviations were identified during the initial portion of the test. The calibration tags on the test instruments and recorders were checked to assure that all the test equipment was within its calibration cycle.

D. Summary

Based on the information provided above, the staff has determined that: the portion of the test observed was performed in accordance with the test procedure; the required data and information was accurately documented by the test personnel; and no anomalies or deviations were identified.