



STACOSWITCH

a STACO, INC. company

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SEISMIC QUALIFICATION TESTING

Seismic qualification tests of Stacoswitch switches were conducted on the dates of July 8 and 9, 1976 by Approved Engineering Test Labs, Chatsworth, California. Testing was done in compliance with an order placed by Consolidated Controls Corporation for Control Panel Modules for the TVA Bellefonte Nuclear Plant Units 1 and 2. All test procedures were in accordance with I.E.E.E. 344-1975 and TVA 2200 Appendix "C." Tests were performed on approved AETL equipment subject to periodic calibration on a regular schedule.

In addition to the 1MR/006-6 module, the following Stacoswitch units were also tested:

- Series 66S07A with .63 square Pushbutton Lens and Lamp.
- Series 1M0103 Matrix with Mounting Dress Bezel with one 4OMS07A and two 4OMS07B Switch Modules, Display Pushbuttons and Lamps.
- Series 1M0101 Matrix with 4OMS08B Switch Module, Display Pushbutton and Lamps.
- Series 1MR0101 Matrix with 4MRS08B Switch Module, Display Pushbutton and Lamps.
- Series 2S4A1C Switch with Display Pushbutton and Lamps.
- Series 45S08B Switch with Display Pushbutton and Lamps.
- Series 4ORAS08B Switch with Display Pushbutton and Lamps.

The switches were installed in a test fixture and were mounted on a vibration exciter. The switches were subjected to a search for resonance in each of the three major orthogonal axes over the frequency range of 1 to 35 Hz at an applied double amplitude of 1.0 inch up to a limiting value of 0.3 g peak. The sweep rate was one octave per minute. Resonance is defined as transmissibility greater than 1.5. No resonance was detected.

The switches were then subjected to high level sinusoidal vibration in the B-C axis, both in phase and 180 degrees out of phase. The test was also performed in the B-A axis in phase and 180 degrees out of phase. Testing was performed over the frequency range of 1 to 35 Hz at an applied double amplitude of 5.0 inch up to a limiting value of 3.0 g peak. Dwells were performed at third octave intervals for 20 second periods during the up and down sweeps. The dwell frequencies were 1.0, 1.3, 1.7, 2.0, 2.6, 3.3, 4.0, 5.3, 6.7, 8.0, 10.7, 13.3, 16.0, 21.3, 26.7, 32.0, and 35.0 Hz.

During all high level sinusoidal vibration testing, the switches were monitored with a chatter-transfer detector. No chatter or transfer was noted during the test program.

At the conclusion of all tests a thorough examination of all switches was made for loose fasteners, electrical failure, damage or degradation, and that all lamps were "ON." The examination revealed no damage or other adverse effects.