

NUCLEAR ENVIRONMENTAL QUALIFICATION

NEQ-610

SUMMARY

The environmental qualification testing of NEQ-610 Heat Shrinkable Tubing was conducted by MEC (Mu-Sigma Engineering Consultants Limited) and is fully reported in MEC document 08490-FTR-Rev.02 March 1995. The elements of this testing with a brief outline of each are:

- 1) **Pre-test Inspection**
 - dimensional verification and photographic record
- 2) **Baseline Functional Test**
 - dielectric strength testing per CSA C22.2 No. 0.3 paragraph 28.1.1.2(b)
 - acceptance criteria - leakage current less than 1 mA at 3600 VAC
 - insulation resistance per CSA C22.2 No. 0.3 paragraph 4.28.1.1
 - acceptance criteria - maintain 90% of unaged specimens resistance at 500 VDC
- 3) **Radiation Exposure**
 - 134.94 Mrads at a dose rate of approx. 276 Krads/hr
- 4) **Post Radiation Function Tests**
 - per baseline tests
- 5) **Thermal Aging**
 - accelerated aging to simulate a 90°C - 40 yr. life
- 6) **Post Thermal Aging Functional Test**
 - per baseline test

7) **Accident Simulation**

- the temperature and pressure bounding limits were designed to encompass both a Loss of Coolant Accident (LOCA) and a Main Steam Line Break (MSLB) events. The test profiles of temperature and pressure are shown below. During the accident simulation the splices carried a 600 volt 20 amp load and were exposed to a chemical spray of pH10 for a period of 52 minutes, 20 minutes after the start of the test.

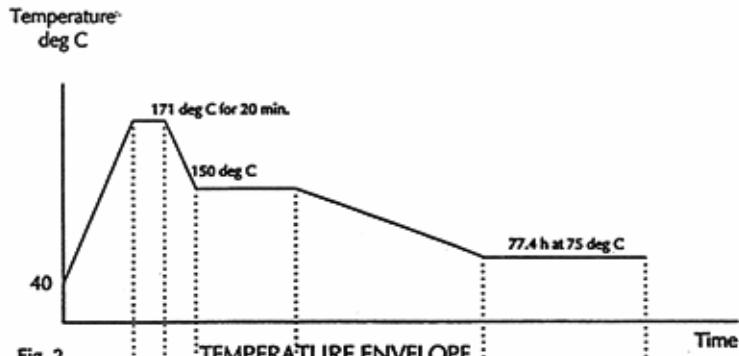


Fig. 2

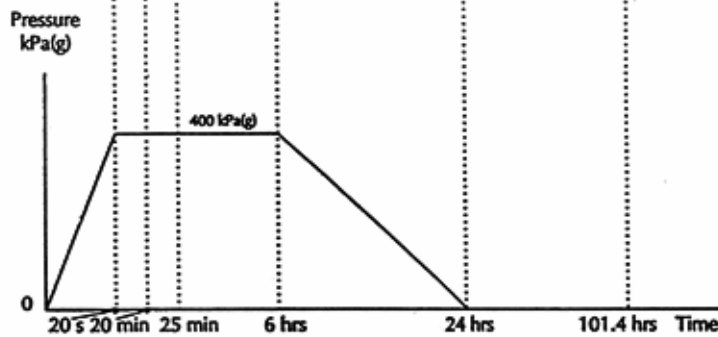


Fig. 3

FIGURES 2 AND 3
ENVIRONMENTAL ENVELOPES FOR DBA AND MSLB TESTING

8) **Post -Accidental Function Tests**

- per baseline functional tests

9) **Mandrel Test**

- splice bent around mandrel approx. 40 times splice diameter

10) **Post-Mandrel Functional Tests**

- per baseline functional tests

11) **Seismic Test**

- seismic shake test was carried out with acceleration levels and input frequency per figure 4 below

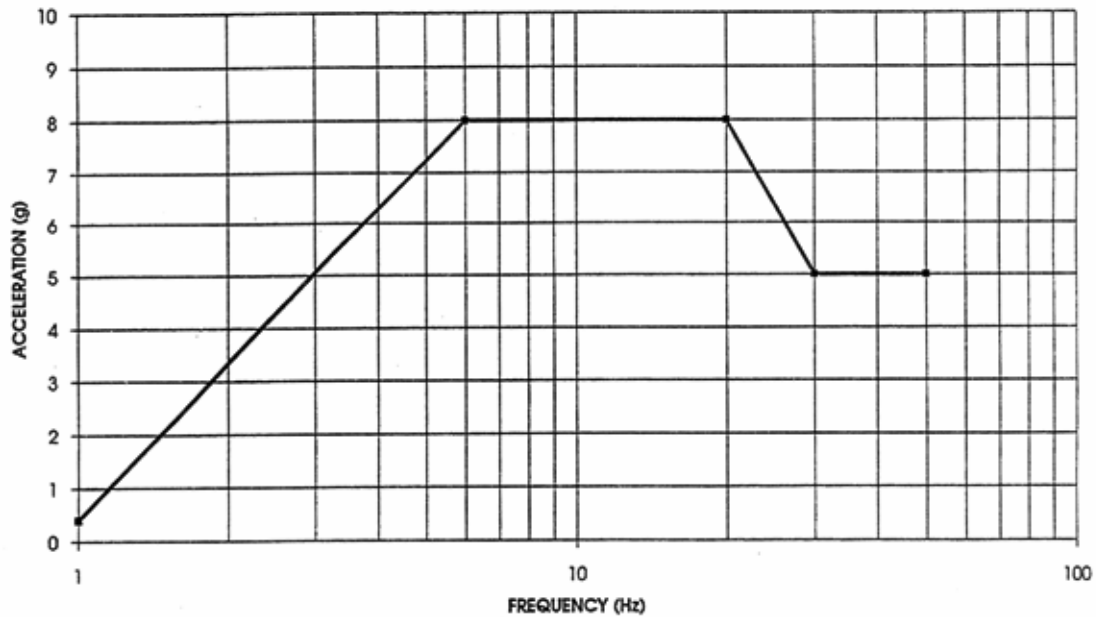


FIGURE 4:

TABLE INPUT MOTION FOR SEISMIC QUALIFICATION OF 3M SPLICES

12) **Post-Seismic Functional Test**

- per baseline functional tests

13) **Post-test Inspection**

- the specimens were visually inspected and a photographic record made

QUALIFICATION OF 3M CANADA INC.
NEQ-610 HEAT SHRINKABLE CABLE SPLICE ASSEMBLY
MEC REPORT DOCUMENT 08490-FTR-REV.02 MARCH 1995