

ORNL INSTRUMENT EVALUATION SUMMARY

Ludlum Model 78 Stretch Scope

Description: The Ludlum model 78 Stretch Scope is a two-detector extendable dose rate instrument.

Ranges Tested: N/A

Report Date: January 6, 2003

General Comments:

1. Confidence intervals used to ascertain whether results are conclusive or inconclusive are determined using the 0.95 quantile of the student's t distribution (95% confidence interval).

RADIATION RESPONSE

Probe Surface Sensitivity: N/A.

Energy Response: The instruments were subjected to various intensities of gamma and x-ray fields at four energies: 30 keV, 50 keV, (generated by an x-ray machine), 661 keV (from a Cs 137 source), and 1332 keV nominal (from a Co60 source). Other than at 30 keV, each unit tested appeared to have a fairly flat energy response. Additional details are available in the test report.

Response Linearity: Each unit was within $\pm 20\%$ of the applied radiation field from 80 mR/hr to 8.608 R/hr. There was a noticeable difference between the analog and LCD readings as the applied dose rate increased. Additional details are available in the test report.

ELECTRONIC and MECHANICAL REQUIREMENTS and TESTS

Line Noise: N/A

Power Line Variations: N/A

Conducted Radio Frequency: N/A

INTERFERING RESPONSES TEST RESULTS

Radio Frequency/Microwave: No susceptibilities were observed when exposed to an RF scan from 100 kHz to 1000 MHz at 20 ± 2 volts/meter amplitude modulated with 1 kHz at 80%.

Electric Fields: Not performed.

Magnetic Fields: No susceptibilities were observed when exposed to a 10 Gauss DC field in both orientations relative to the magnetic field emission lines. No susceptibilities were indicated when exposed to the 60 Hz (1.26 Gauss) AC field in two orientations.

Interfering Ionizing Radiations: Not performed.

ENVIRONMENTAL FACTORS

Temperature: No susceptibilities were observed over the temperature test range of -10 to 50 °C (+14 to +122 °F).

Temperature Shock: No unacceptable responses were observed when exposed to rapid temperature changes from 22 to -10, -10 to 22, 22 to 50, and 50 to 22 (in °C). Each change was performed within five minutes.

Humidity: No susceptibilities were observed when exposed to a relative humidity level of 95% (non-condensing) for 19 hours. This test is normally performed for 24 hours.

Vibration: Not performed.