ORNL
INSTRUMENT EVALUATION SUMMARY

Ludlum 4500 Vehicle Portal Monitor

Description: The Ludlum 4500 is a vehicle portal monitor and provides neutron and gamma radiation detection.

Ranges Tested: N/A

Report Date: August 2003

General Comments:

1. Testing was limited to susceptibility to conducted RF line transients and vibration transients.
2. A ring wave and combination waveform was injected into the input power of the Ludlum System at a maximum intensity of 400 volts. This was performed to analyze the effectiveness of the line filter used by the Ludlum 4500. Results are shown in Figures 1 through 4 that indicate the input and output of the filter.
3. 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: N/A

Response Linearity: N/A

ELECTRONIC and MECHANICAL REQUIREMENTS and TESTS

Line Noise: The detector was exposed to 100 kHz ring waves from 0.5 to 2.0 kV and combination waves [1.2/50 µs (open circuit) – 8/20 µs (short circuit)] from 0.5 to 2.0 kV. No susceptibilities were indicated. Specific results are in the test report.

Power Line Variations: N/A

Conducted Radio Frequency: No response changes were indicated during exposure to injected RF energy over a frequency range of 150 kHz to 80 MHz at an intensity of 27.1 dBm.

INTERFERING RESPONSES TEST RESULTS

Radio Frequency/Microwave: Not performed.

Electric Fields: Not performed.

Magnetic Fields: Not performed.

Interfering Ionizing Radiations: Not performed.

ENVIRONMENTAL FACTORS

Temperature: N/A

Temperature Shock: N/A

Humidity: N/A

Vibration: No susceptibility was observed during or after testing. The detector was exposed to a range from 5 Hz to 150 Hz at an amplitude of 1G in one (vertical) orientation relative to the vibration surface.