Executive summary of effect of Nuclear EMP on Amateur radio equipment.

A nuclear EMP is made up of 3 pulses.

E1: Duration 5-10 nanoseconds at 50,000+v. Much faster than lightning arresters. E1 is the most destructive to electronic components. Caused by gamma radiation striping electrons off the neutrons of air molecules.   Lightning arresters <u>do not</u> stop this pulse. (See #5)

E2 Duration 1+/- second. Similar to lightning. (Think giant static discharge) Caused by gamma radiation produced by neutrons that have lost their electrons.   Lightning arresters will stop this pulse.

E3 Duration 10 sec - 10 min.   Nuclear explosion causes geomagnetic disruption which induces huge currents and heat in long electrical lines damaging transformers and melting major components. This pulse has a similar effect as a solar CME Coronal Mass ejection.

Damage will depend on elevation, distance and angle from the source. Since the E3 pulse will likely eliminate the electrical grid, grid tied generators and telecommunication infrastructure a hardened alternative power system would be required. Solar panels and batteries in of themselves are immune to the pulses but will be damaged if if they are tied to the grid.

Strategies to protect Radio equipment from EMP

1. Redundancy. Rotate redundant sets of equipment. One set in use, the other in a Faraday cage.

2. Separation from power grid and a protected back-up power system.

3. Unplug unused equipment from power grid and antennas.

4. Robust grounding and lightning arresters on antenna towers and feed lines which helps protect against E2, E3 and lightning.

5. EMP Shield device on each antenna. EMP Shield™ is the World's only tested and approved EMP protection technology. The EMP Shield is electromagnetic pulse, Solar Flare, and lightning protection system designed to exceed the requirements of MIL-STD-188-125-1 for shunting over-voltage spikes.) https://www.empshield.com/radio-protection/

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