

PROTECTION -- From: Volume 1: EMP Executive Report- 2004

Widespread functional collapse of the electric power system in the area affected by EMP is likely. It is impractical to protect the entire electrical power system from damage by an EMP attack. There are too many components of too many different types, manufacturers, designs, and vulnerabilities within too many jurisdictional entities, and the cost to retrofit is too great.

Some equipment that is essential for operation of critical infrastructures may be more economically stockpiled and stored in EMP-shielded structures than redesigned to be EMP hardened. Other equipment with long replacement times or uncertainty of availability after an EMP attack will require EMP-hardening against E1, E2 and E3 hazards.

While modeling of EMP vulnerability and mitigation measures is desirable, there is no substitute for full system testing to failure to project the likely post-EMP attack operability or prompt recovery of critical infrastructure equipment.

From: 2017 EMP commission report

Widespread functional collapse of the electrical power system in the area affected by EMP is possible in the face of a geographically broad EMP attack, with even a relatively few unprotected components in place. However, it is practical to reduce to low levels the probability of widespread damage to major power system components that require long times to replace.

This will enable significantly improved recovery times, since it avoids the loss of long lead-time and critical components. It is important to protect the ability of the system to fragment gracefully into islands, to the extent practical in the particular EMP circumstance. This approach is cost-efficient and can leverage efforts to improve reliability of bulk electricity supply and enhance its security against the broader range of threats.

RESTORATION

The key to minimizing adverse effects from loss of electrical power is the speed of restoration. Restoration involves matching generation capacity to a load of equivalent size over a transmission network that is initially isolated from the broader system. The larger system is then functionally rebuilt by bringing that mini system, or “island,” to the standard operating frequency and thereupon by adding more blocks of generation and load to this core in amounts that can be absorbed by the growing subsystem. This is a demanding and time-consuming process in the best of circumstances. In the singular circumstance of an EMP attack with multiple damaged components, related infrastructure failures, and particularly severe challenges in communications and transportation, the time required to restore electrical power is expected to be considerably longer than we have experienced in recent history.