



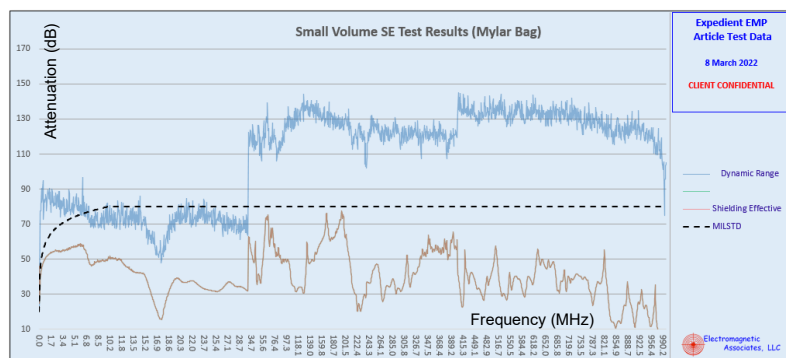
URGENT, IMMEDIATE OPTIONS FOR EMP PROTECTION

“Post-EMP restoration in timelines adequate to sustain society is possible if - and only if - most power companies emulate the industry leaders who are working diligently on prioritized hardening.”

- From EPRO® Handbook IV: “EPRO EMP”

While some leading utilities have invested in comprehensive EMP protection, most have not yet done so. With today’s unusual geopolitical instability, EIS Council and its partners have assembled a brief list of urgent, low cost, immediate protective steps power companies and critical facilities may consider taking.

While not approaching the effectiveness of embedded protection (see the insert, below for access to the “EPRO EMP” Handbook), these steps may help mitigate the impact of an EMP strike. All are relevant to electric companies – most are relevant to any critical facility. Please refer to the Handbook for the most up-to-date information on vulnerable components.



Test results on shielding effectiveness of conductive mylar bags.
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Immediate EMP protection options

1. Pre-deploy, on-location in all critical facilities:
 - a. Spares for vulnerable components (e.g., digital equipment such as protective relays). These units should not be energized and, if possible, should be stored in conductive bags or enclosures (see test results, above).
 - b. As many mobile shortwave and low-band VHF radios as possible. Radios should be stored in conductive bags or enclosures. (Note: VHF may be particularly helpful in the early hours post-EMP, when shortwave will be plagued with noise).

- c. Rechargeable battery packs to operate the most critical equipment, sufficient for several hours (with appropriate power management units and shielded cables), and a generator for recharging, with a small ~30-day propane tank (or equivalent). It will also help to locate and widely post information on existing / available generators, spare parts and deployment plans to aid in restoration efforts.
 - d. Backup computers / servers with current backup copies of software (including relay configurations), stored in conductive enclosures and disconnected from power.
2. *Prioritized for critical computer-based equipment* (relays, SCADA, etc.), insert power-cable surge protectors. For ethernet and other signal cables, swap in fiberoptic cable or wireless options.
 3. Immediately (and frequently) update and distribute plans for personnel deployment upon a power outage with communications disruption, with or without vehicles.
 4. Organizations may wish to assist critical employees' families with acquiring backup supplies of food, water, security and medical needs.
 5. Understand where critical equipment is located, with clear documentation in hard copy. For power companies and other facilities with large components such as power transformers, ensure that critical information is available so that heavy haul movement will not be delayed during an emergency. This would include contact information (and emergency contact provisions) for rigging companies, railway and heavy haul specialized equipment carriers.
 6. Make sure technical personnel understand how to determine if a digital device has failed as a result of an EMP event, and where replacement items may be available.
 7. Provide guidance to response personnel on where they should first meet to respond after an event and the locations where power restoration should initiate.
 8. Emergency installed standby generators should have their fuel supplies "topped off" in preparation for an event. (Where possible, this may involve storing a tanker truck at the facility, which may also be used to fuel repair vehicles).
 9. Review of blackstart restoration plans to make sure areas that may be currently unavailable due to maintenance or construction are understood by operating personnel.

"Leading power companies and their partners (including government regulators) are investing in prudent, prioritized measures to reduce their EMP vulnerabilities, and enable effective restoration following an EMP-induced large scale power outage. This Handbook captures and shares their emerging best practices, providing a comprehensive menu of the best options to accomplish these protection and restoration goals, along with a summary of the most recent EMP research and testing results."

Find a hardcopy of EPRO® HANDBOOK IV: EMP on Amazon, at <https://lnkd.in/dk7CGci>

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