Electromagnetic Pulse (EMP) EPRI Project Update

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Categorizing Electromagnetic Pulse (EMP)

- Intentional, man-made attack
  - **E1 – Very fast rise time**, may result in damage to electronic components either directly, or by coupling into the attached wires.
  - **E2 – Similar to lightning**, can result in damage to electronics and potential flashover of distribution class insulation.
  - **E3 – Long duration and low frequency**, similar to GMD, but EMP (E3) has two potential impacts; increased reactive power consumption and potential protection system misoperation as a result of harmonics.

- EMP can occur with little or no warning, most operational strategies are inapplicable.
High Altitude Burst Generated EMP (HEMP)

- The HEMP signal extends to the visual horizon as seen from the burst point.
- A large device detonated at 400–500 km over central USA would affect all of the continental USA.
- Effects depend on: altitude of the detonation, energy yield, gamma ray output, interactions with the earth’s magnetic field, and electromagnetic shielding of targets.
Understanding Probability and Consequence

What can be done to limit the impact?

Do we understand the potential impact?

Is EMP Truly a High Impact Low Frequency Event?

Likelihood

Frequent

Minor

Moderate

Major

Extreme

Impact

Rare

Unlikely

Possible

Likely
EMP Project Plan – Initial Focus on Transmission

Three year Research Plan beginning February, 2016
Together…Shaping the Future of Electricity

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