Technologies to Prevent and Mitigate Severe Accidents

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Exelon Generation®

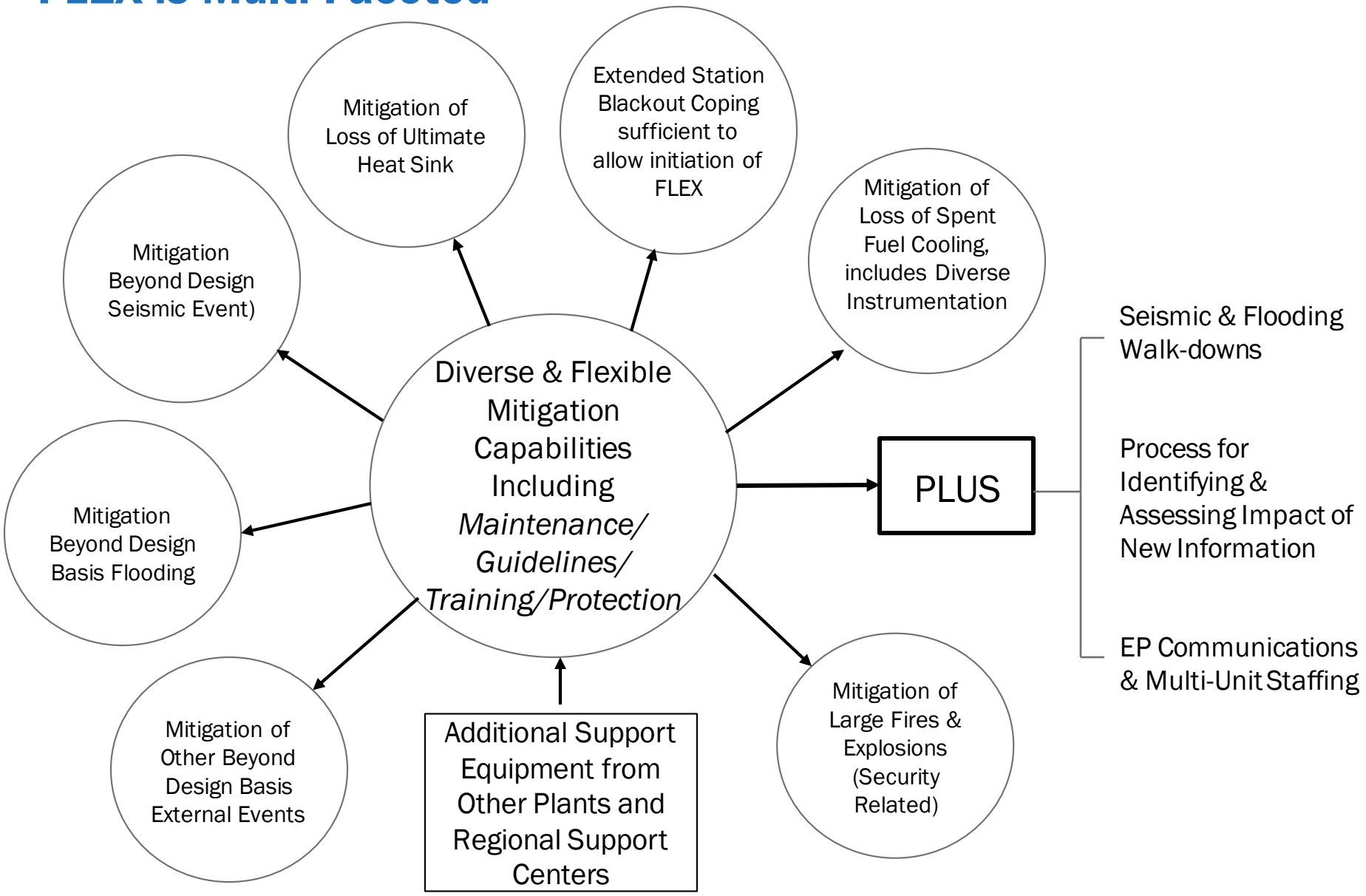
Core Damage Prevention – FLEX and Hazard Recognition

- Understand the nature & likelihood of extreme events
  - Seismic & flooding hazard re-evaluations
  - Focus on preventing core damage

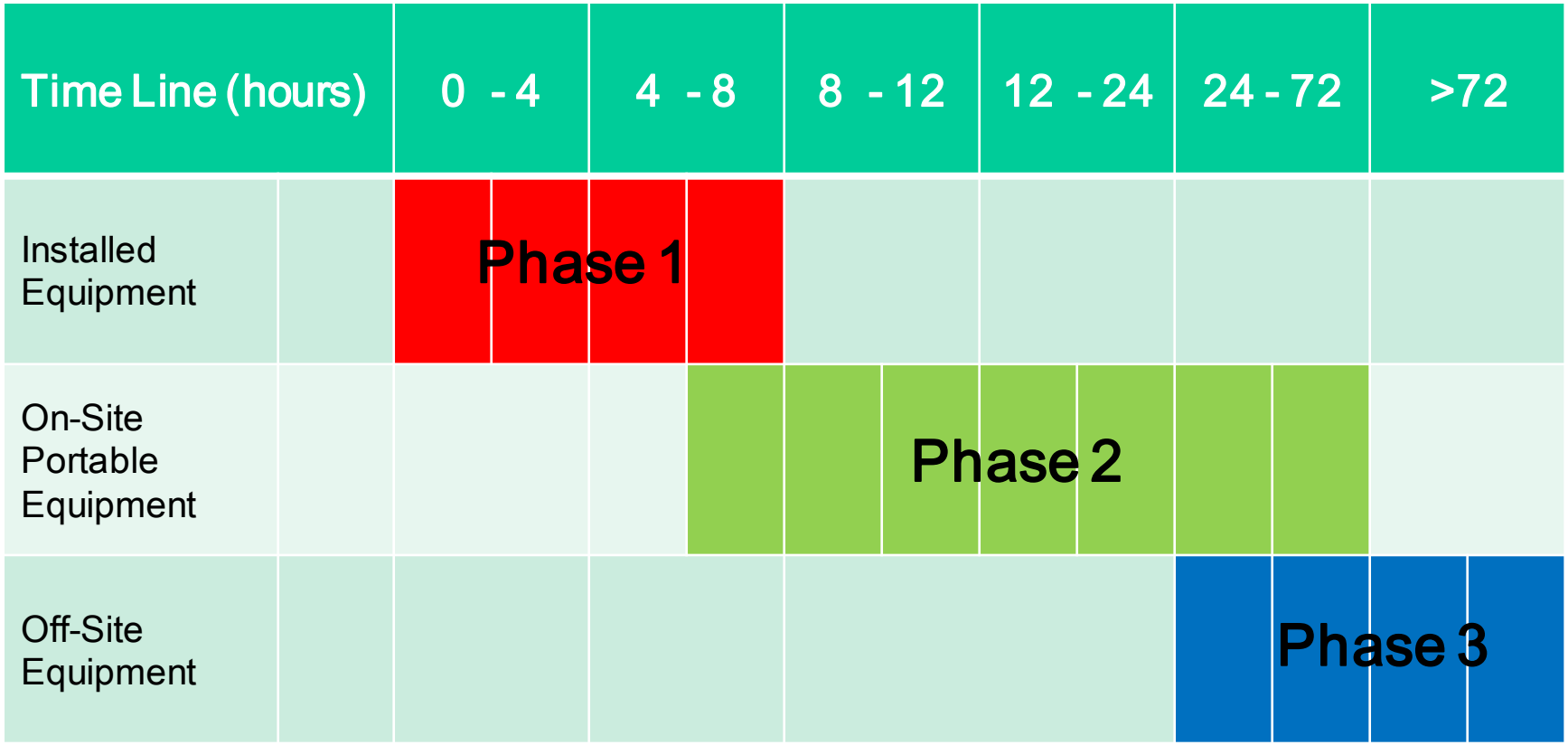
- Flexible strategies for maintaining core cooling, spent fuel cooling & containment function
  - Maximize capability of installed equipment
  - Supplement installed capability with portable equipment
  - Backup equipment from national response centers

- Research and development opportunities
  - Determine beyond design basis capability of installed equipment and possible enhancements

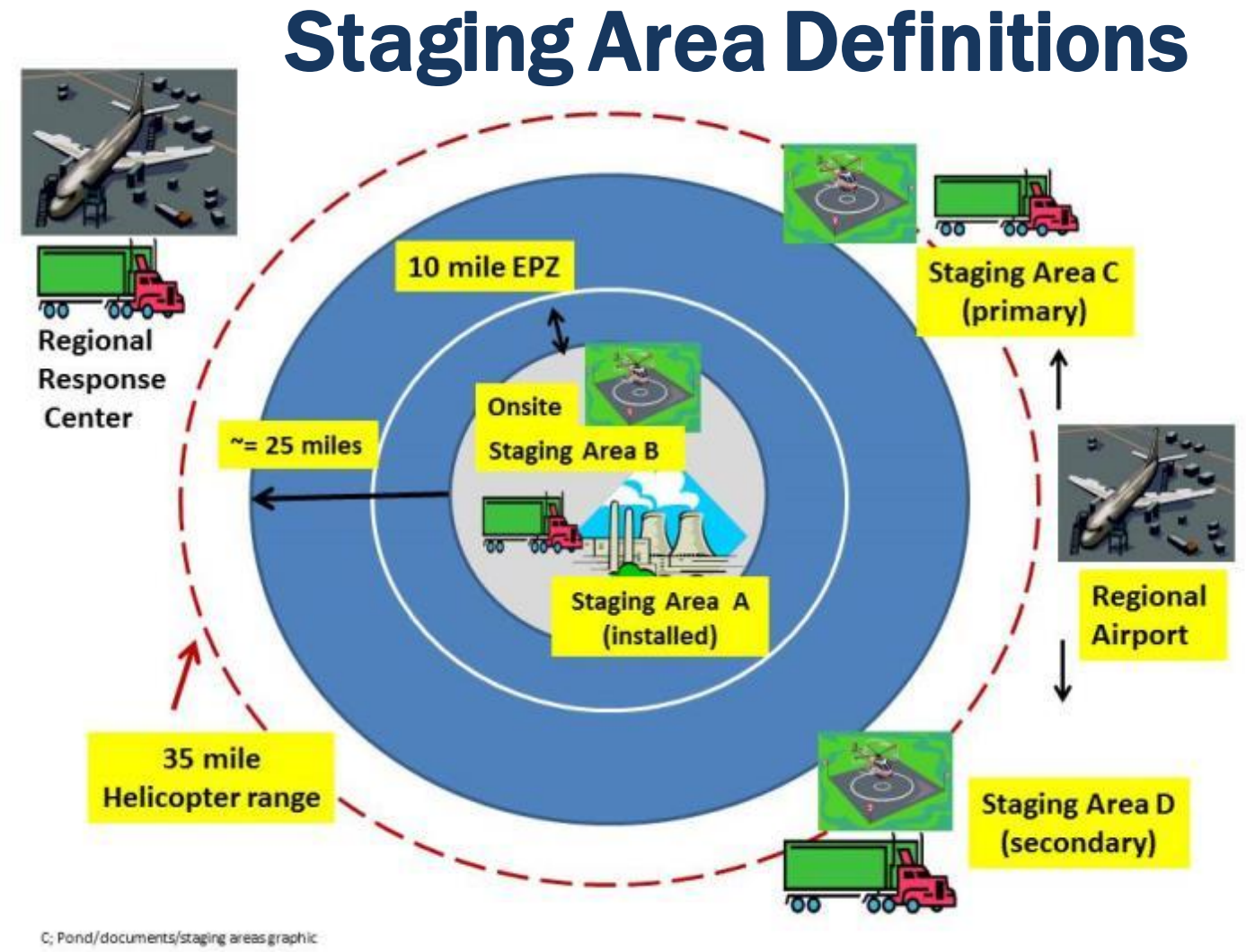
FLEX is Multi-Faceted



FLEX is a Phased Approach

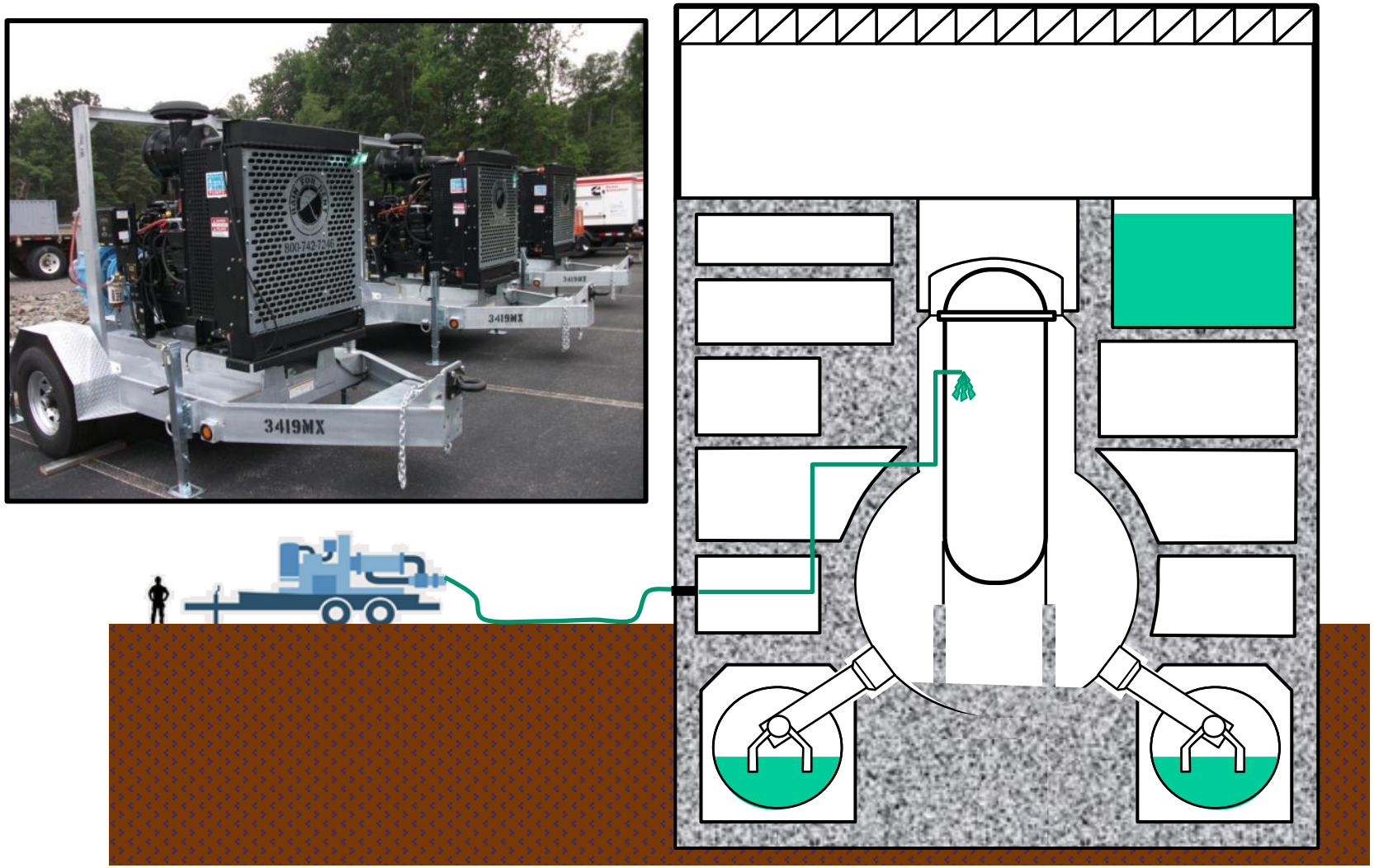


FLEX is Defense in Depth



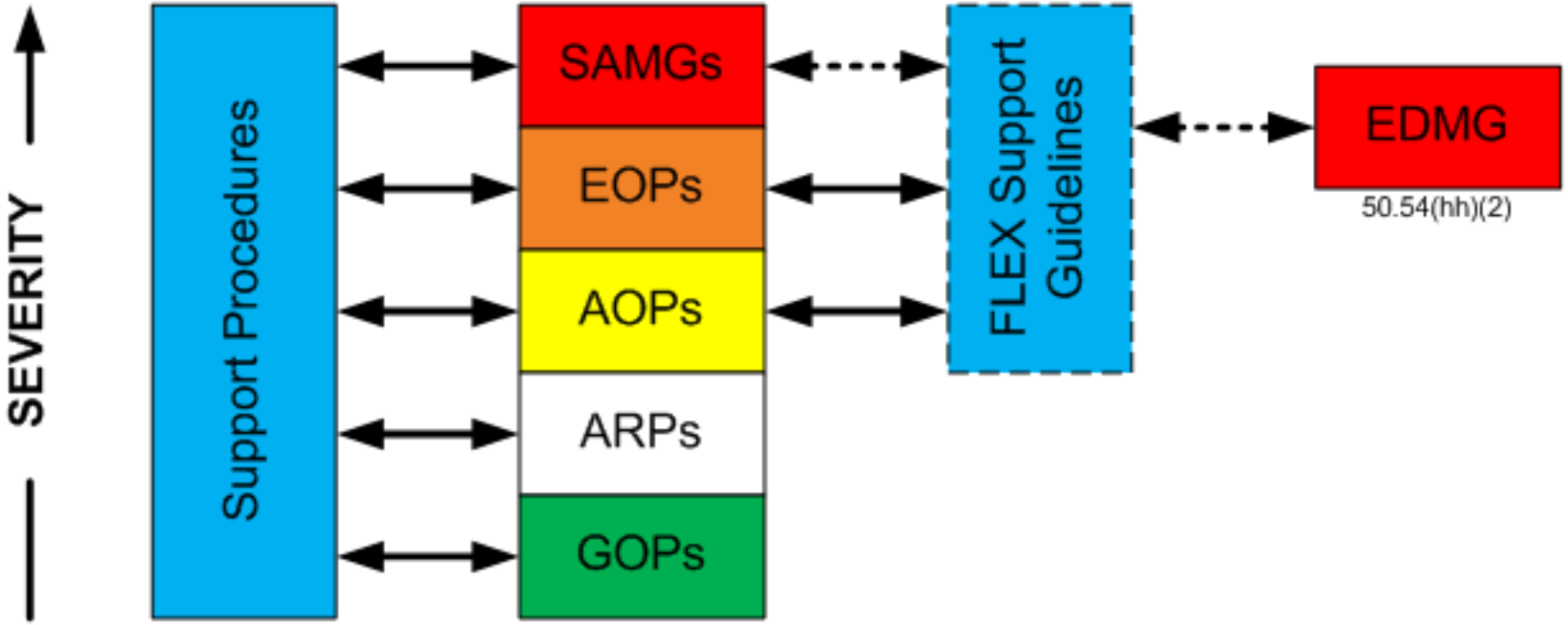
FLEX Approach is Site Specific for Electrical Power

FLEX Approach is Site Specific for Mechanical Connection



FLEX is Supported by Procedures & Training

Procedure Hierarchy



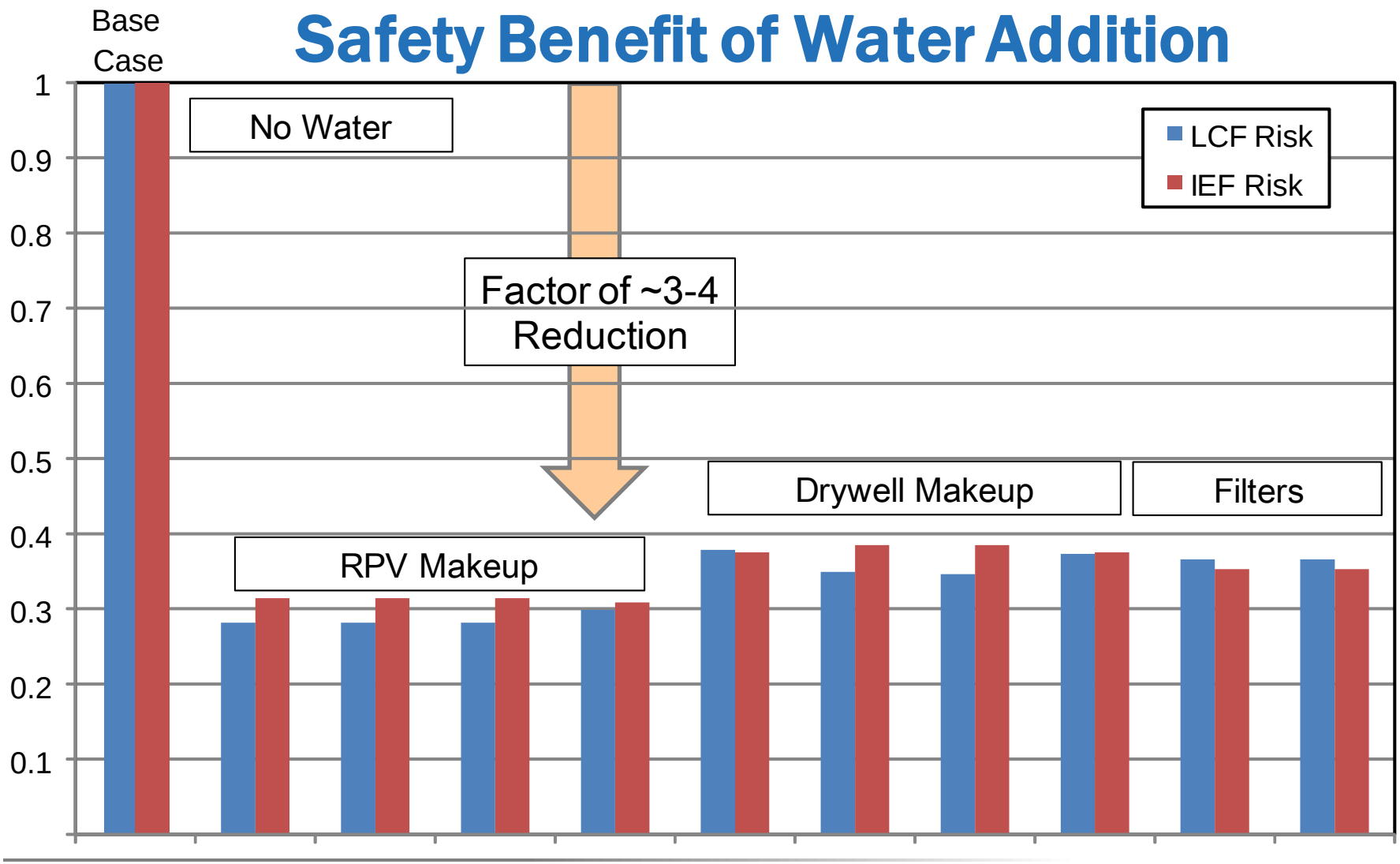
The purpose of FLEX is to prevent core damage. FLEX can still provide capability for accident mitigation if the core is damaged

Containment Integrity/Fission Product Confinement

- Strengthen functional capability of containment
  - Containment function is to confine radioactive material
  - Enhance capability of containment to retain its design function capability
  - Maintain pressure below design limits and temperature within acceptable limits to prevent gross leakage
  - Value of water addition confirmed for Mark I and II

- Research and development opportunities
  - Evaluation of other containment designs continuing

Containment Protection & Release Reduction



Monitoring the Plant – See the Trends – Anticipate Next Steps

- FLEX maintains parameter monitoring capability
  - Lists critical instrumentation
  - Pre-plan alternatives to power instruments
  - Procedures for monitoring equipment without AC or DC power
  - Instrumentation needs overlap between core damage prevention and mitigation

- Research and development opportunities
  - Instrumentation to improve recognition of vessel breach signature; for example, thermocouples under vessel
  - Portable, remote instrumentation capability.
    - Portable remote receivers, low power requirements, no wiring through containment penetrations.

Suppress Radioactive Material Release & Transport

- If core damage prevention fails:
  - Place high priority on maintaining containment function
  - Use in containment confinement and filtering (wet containments) capability
  - Prolong containment holdup time to maximize fission product plate out & deposition
- Research and development opportunities:
  - Accident tolerant fuels
  - Forensic investigation of Fukushima will yield valuable insights
  - Core melt progression, molten debris cooling & spread behavior

Conclusions, Next Steps

- Important lessons have been learned regarding our capabilities to prevent and mitigate extreme events
- Significant safety enhancements have been made since the accident
- Our learning process can be furthered through R&D activities focused on
  - Understanding the nature and likelihood of extreme events
  - Sustaining our continuous learning process on severe accident mitigation
  - Supporting a coordinated forensic investigation of the damaged units at Fukushima