Industry Response to Fukushima

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Industry Goal

- Apply the lessons-learned from the Fukushima accident to enhance the safety of the U.S. reactor fleet
- Implement an improved and integrated approach for Tier 1 recommendations
  - Achieve greater safety benefit in a shorter time

Actions to Enhance Safety

- Validate design bases for natural phenomena
- Provide a diverse and flexible mitigation capability (onsite)
  - Supplemented by regional support centers
- Other key actions

U.S. Industry Actions to Date

- Verified equipment, procedures and staffing are capable for mitigating extreme events
- Enhanced capability to protect spent fuel storage pools against extreme external events
- Assessed effectiveness of reactor operator training
- Improving ability to cope with an extended loss of AC power
- Assessing need for additional instrumentation for monitoring core and spent fuel pool

Validate Design Bases for Natural Phenomena

- Inspect protective measures in place for natural phenomena (e.g. seismic, flooding)
  - Deficiencies resolved through corrective action program
  - Assess external event threats
- Review modifications performed since IPEEE reviews
  - Assure adequate margin to address significant vulnerabilities

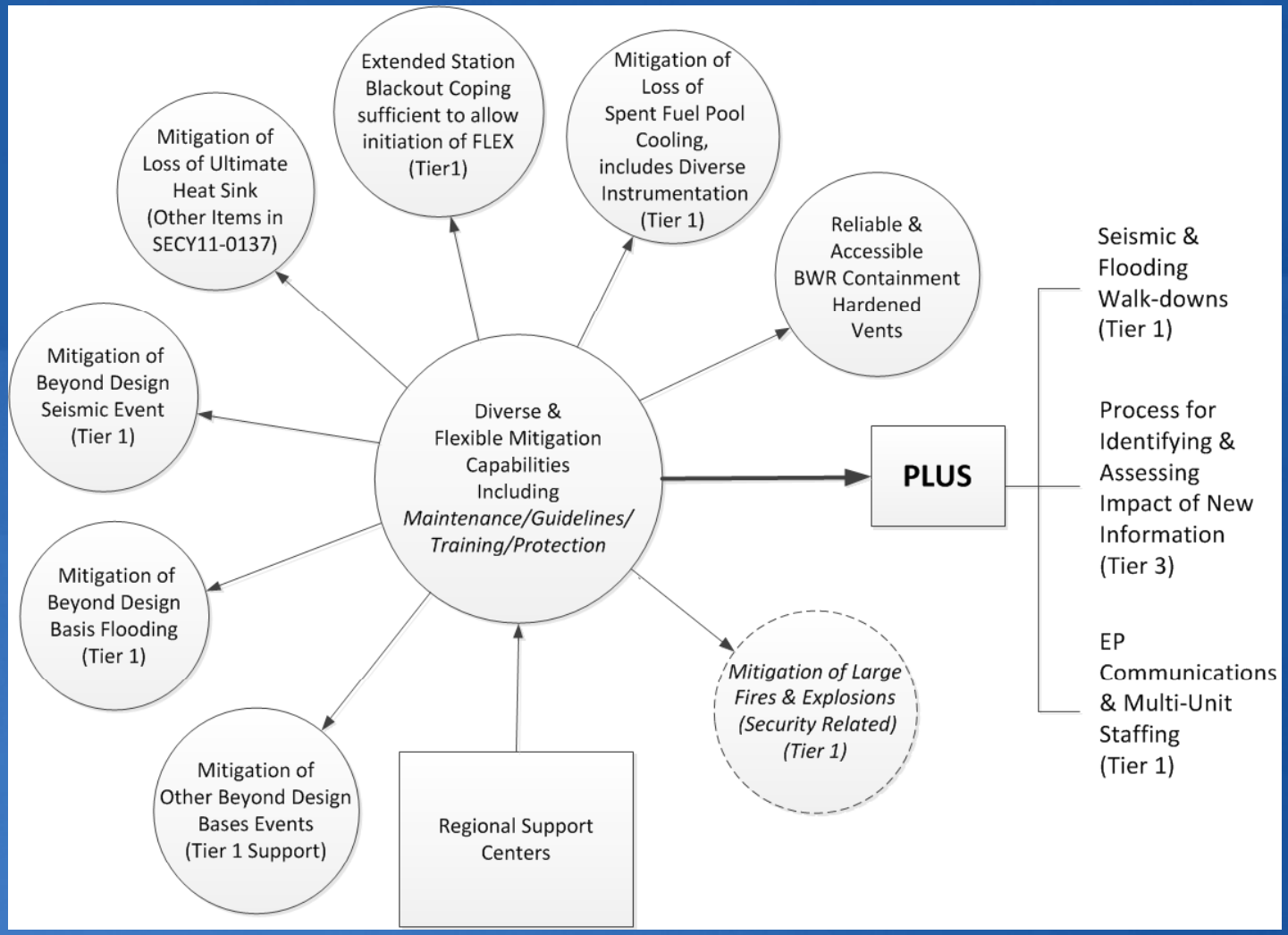
Diverse and Flexible Mitigation Capability (FLEX)

- Additional layer of safety to mitigate beyond design bases events
- Focuses on maintaining key safety functions
  - Core cooling, containment integrity, SFP cooling
- Multiple supplies of power and cooling water
- Portable equipment reasonably protected
- Symptom-based guidance and instructions
- Programmatic controls
- Regional support centers

FLEX Addresses

- Extended loss of all AC power conditions
- Loss of spent fuel pool cooling
- Loss of the Ultimate Heat Sink
- Large fires and explosions
- Reliability of BWR hardened vents
- Beyond-design-basis events:
  - Seismic
  - Flooding
  - Other extreme natural phenomena

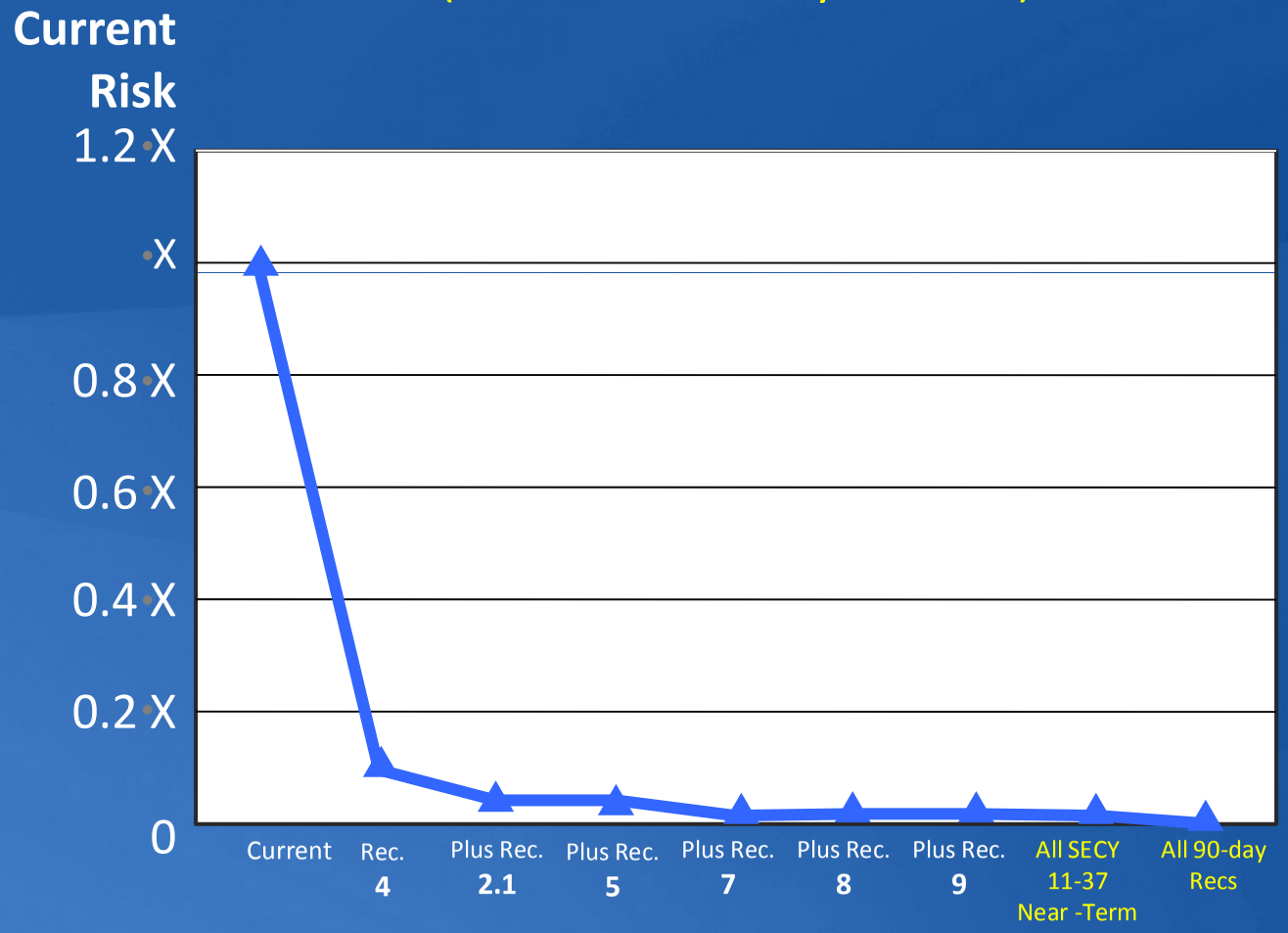
Tier 1 FLEX Approach



Safety Benefit – SECY 11-0137

(Collective Reduction, Sequentially Applied)

(Mean Values Only – Linear)



Observations

- Tier 1 recommendations should be addressed
- SECY-11-0137 does not address risk significance in Tier 1 implementation sequencing
- Risk reduction of Tier 1 recommendations is not equal
- Implementation of FLEX provides greatest risk reduction

Conclusions

- Implementation without consideration of risk reduction diverts resources from most risk significant activities
- Order of implementation has consequence in timely risk reduction
  - Implementation of FLEX results in greatest risk reduction
- Quicker realization of tangible safety benefits