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Modernizing Emergency Planning Regulations

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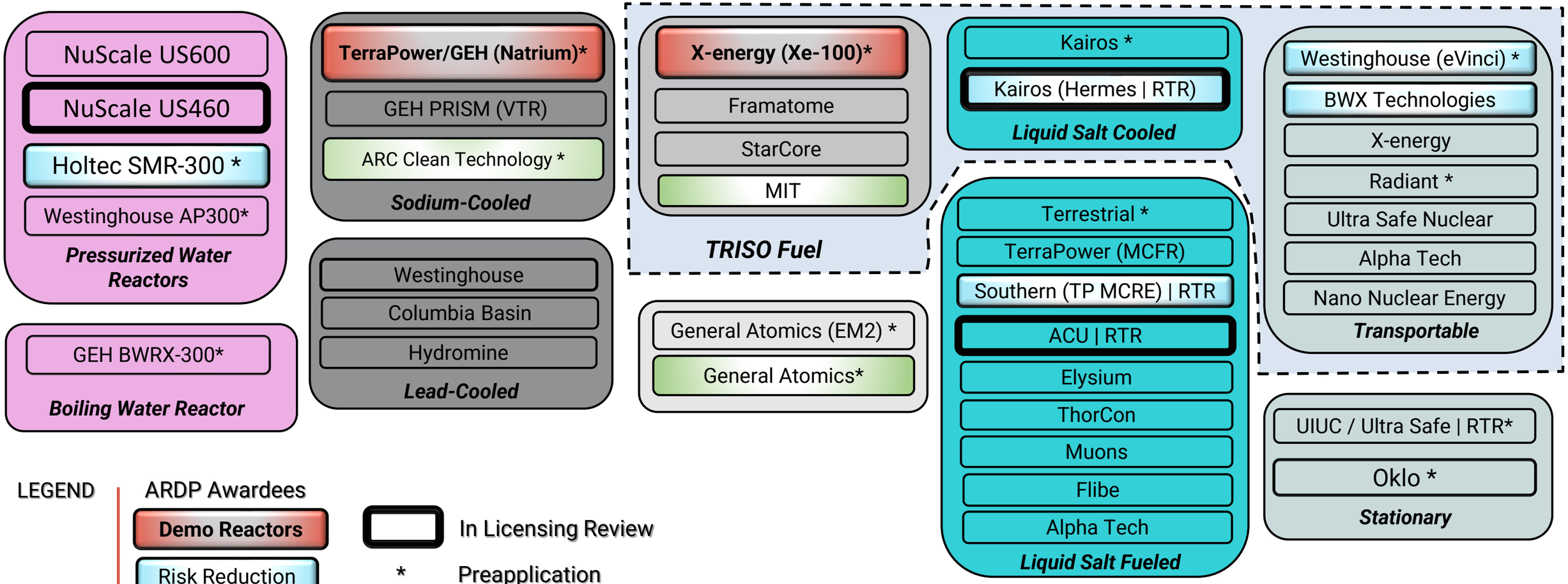
Emergency preparedness

Radiological emergency preparedness—

- *ensures protective actions can and will be taken*
- *is an independent layer of defense in depth*
- *provides dose savings*
- *is risk-informed*

EP is evolving with the advanced reactor landscape



NRC applies a graded approach to EP

Risk-informed to balance the regulatory burden commensurate to the facility risks and hazards

Existing NRC regulations have always used a graded approach to EP

- *Power reactors*
- *Low-power testing and decommissioning*
- *Research and test reactors*
- *Fuel Fabrication Facilities*
- *Independent Spent Fuel Storage Installations*
- *Monitored Retrievable Storage*

Major provisions of alternative EP regulations

The final rule in 10 CFR 50.160 provides an alternative framework for small modular reactors and other new technologies:

- technology inclusive, performance based
  - *performance demonstration in drills and exercises*
- regulatory framework proportional to facility risks
  - *required EP planning activities set commensurate to radiological risk (consequences)*
- hazard analysis for contiguous facilities
- ingestion planning capabilities
- scalable EPZ according to planning needs

Performance demonstration in drills and exercises

Response functions demonstrate *capabilities*

Event classification and mitigation

Protective actions

Communications

Command and control

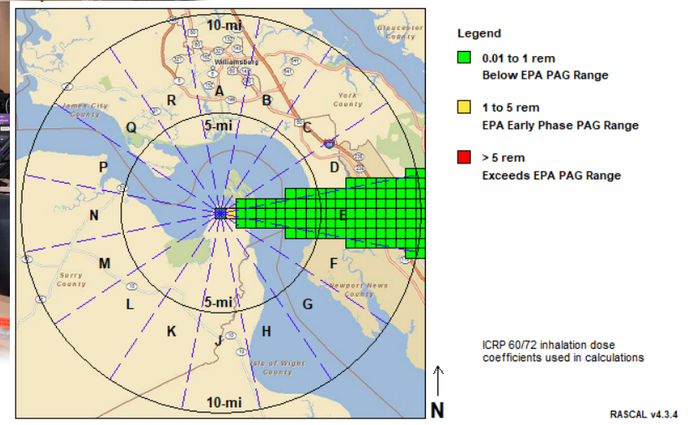
Staffing and operations

Radiological assessment

Re-entry

Critiques and corrective actions

Emergency Classification Level			
Unusual Event	Alert	SAE	GE
↓	↓	↓	↓
Initiating Condition	Initiating Condition	Initiating Condition	Initiating Condition
↓	↓	↓	↓
Emergency Action Level (1)	Emergency Action Level (1)	Emergency Action Level (1) • Operating Mode Applicability • Notes • Basis	Emergency Action Level (1) • Operating Mode Applicability • Notes • Basis



Planning activities commensurate to technology

Planning activities ensure readiness for all facilities

- Prepare and issue public information during emergencies
- Implement the emergency plan in coordination with the security plan
- Voice and data communications with the NRC
- Identify emergency facilities where effective direction and control can be exercised in an emergency
- Site familiarization training for offsite support
- Maintain the emergency plan

Additional planning elements for higher risk

Planning ensures communication, coordination, and cooperation with offsite response organizations

Additional planning elements for EPZs beyond the site boundary:

- contacts and arrangements
- public protective actions
- evacuation time estimate within the EPZ
- primary and backup offsite response facilities
- making and communicating dose projections
- periodic public emergency planning information and alert & notification
- general re-entry plans after an emergency
- drill and exercise programs with offsite response

Hazard analysis identifies other considerations

Address the impact on emergency plan implementation from:

- contiguous or nearby facilities and other credible hazards
- potential impacts of industrial plants, other reactors, transportation systems, or combination of factors
- site-specific, credible hazards from other facilities that may require additional EP considerations

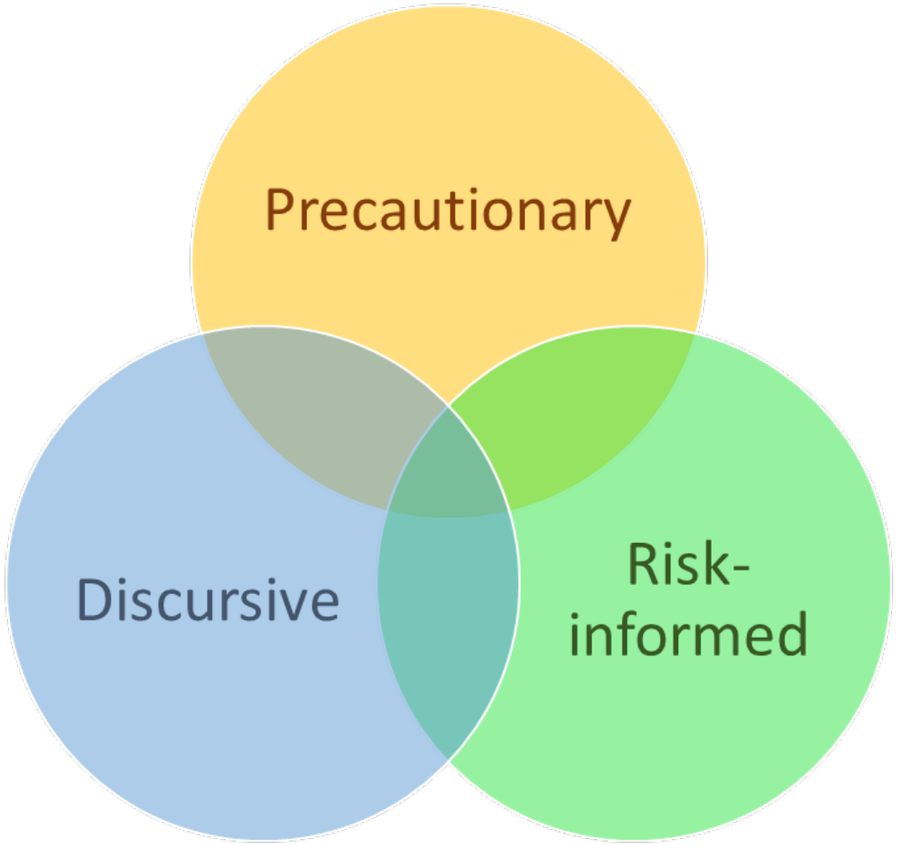
Scalable EPZ to support planning needs

The EPZ is a planning tool

The EPZ determination considers form and function:

- the area within which public dose is projected to exceed 10 mSv TEDE over 96 hours considering:
  - *accident likelihood*
  - *source term*
  - *timing of the accident sequence*
  - *meteorology*
- the area within which predetermined, prompt protective measures are warranted

The future of protection strategies is risk-informed



Major strategies for managing risk

"Risk management is not about avoiding risks, but about navigating through them with wisdom and preparedness."

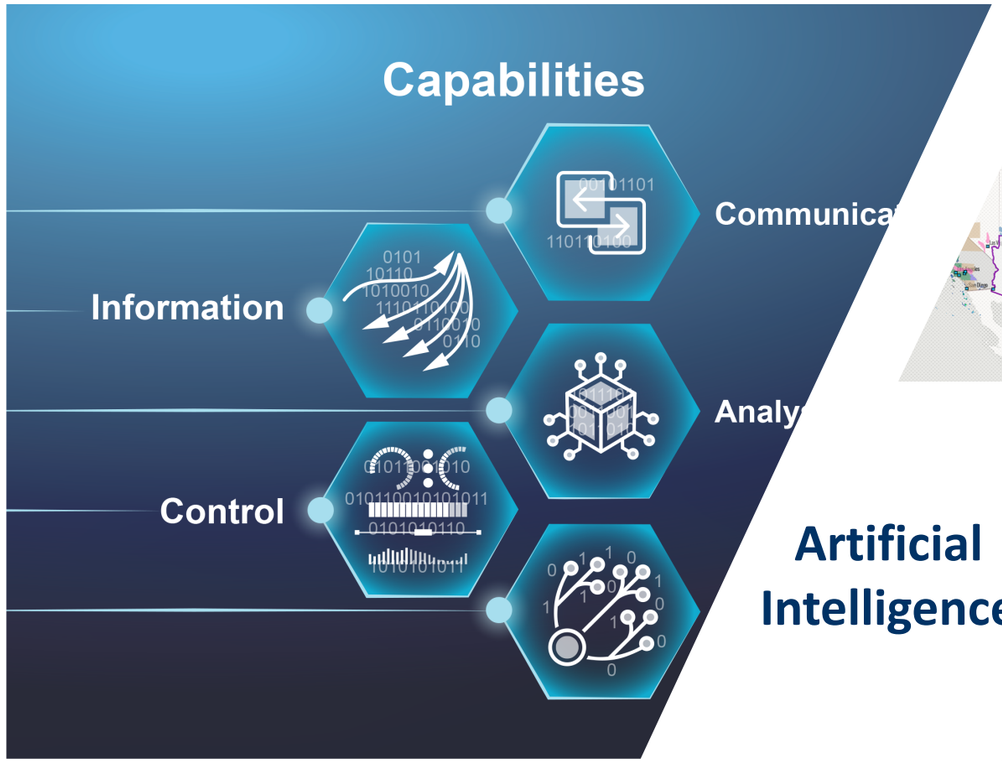
"Risk Analysis: Fundamental Principles," Society for Risk Analysis, Herndon, VA, August 2018. https://www.sra.org/risk-analysis-introduction/risk-analysis-fundamental-principles/
https://www.linkedin.com/pulse/navigating-risk-management-wisdom-preparedness-zane-edwards

Ensures ingestion pathway planning is in place

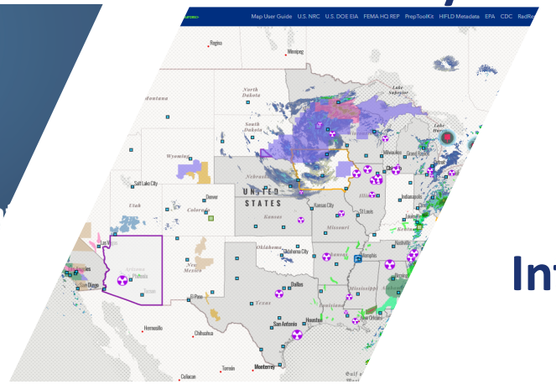
- Emphasizes capabilities and readiness to respond
- Identification of major exposure pathways for ingestion
- Identify resources available at all levels of government to sample, assess, and implement a quarantine or embargo of food and water to prevent ingestion

Technology propels the future of EP

Digital Twins



Geographic Information Systems



IPAWS

Integrated Public Alert and Warning System

Artificial Intelligence

Federal capabilities

Risk-informed performance-based EP regulations prepare us for the future

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