Severe Accident Management and Filtering Strategies

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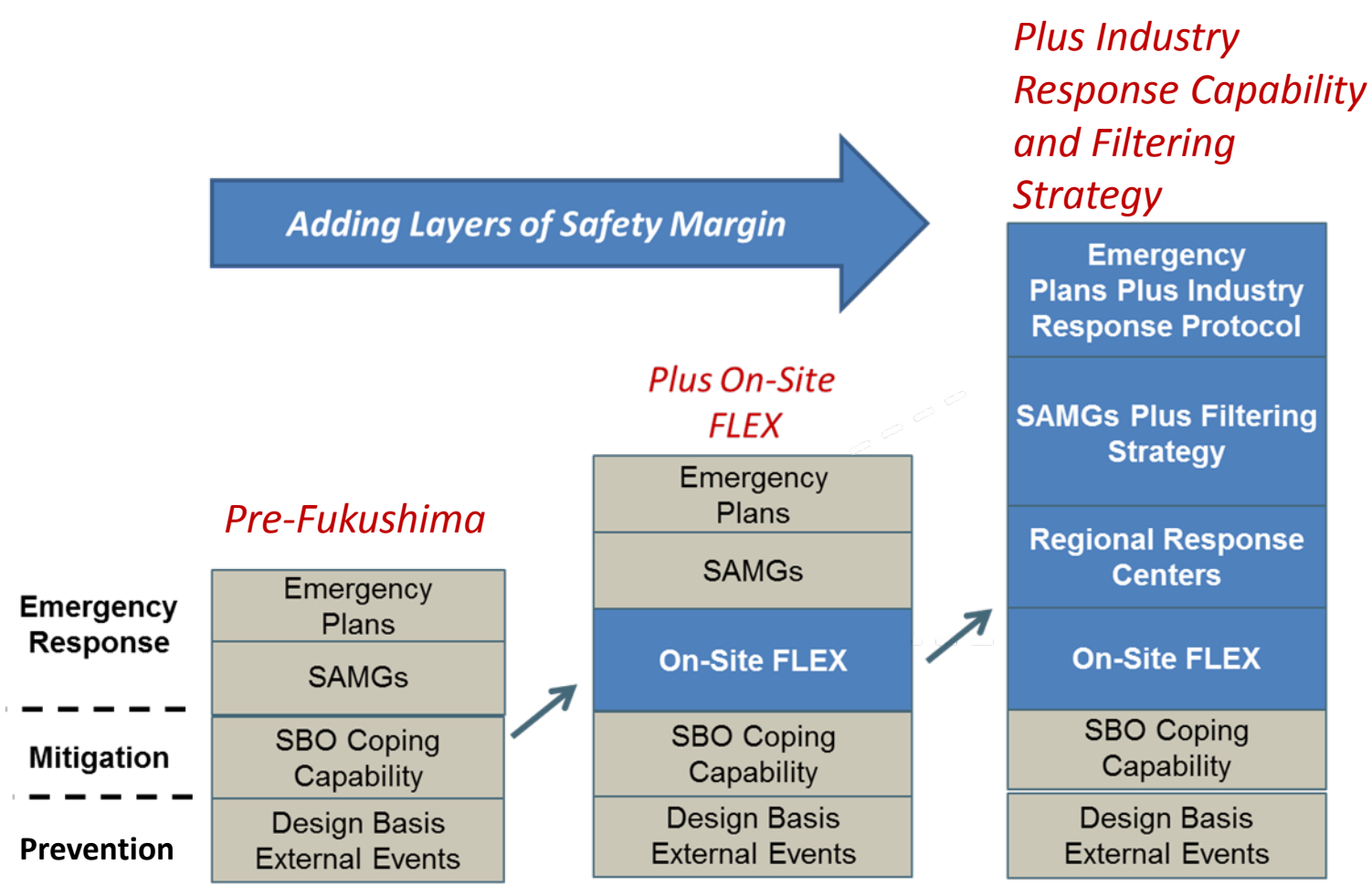
Industry Position

- Industry supports filtration of radionuclides in BWR Mark I & II containments to mitigate land contamination
- Performance-based approach
  - Needed for optimum filtration strategies based on unique plant design features
  - Can be implemented earlier than other options
- Filtration outside containment is not optimal

Layer Upon Layer of Safety Margin



Prevent and Manage Accidents

- Protect the three barriers to fission product release
  - Fuel Cladding
  - Reactor Coolant System
  - Containment
- The containment is a system that must be managed during a severe event

A passive vent filter is not the answer

Managing Containment During Fuel Damage Events

- Prevent containment failure by cooling core debris and controlling pressure
- Filtration of radionuclides **in** containment
- Venting systems are only one aspect of severe accident management

Much broader issue than filter vs. no filter

Managing Containment – Water Injection

- Water is required to cool core debris to prevent containment failure
  - If containment fails, there are multiple uncontrolled release paths
- Water will also filter radionuclides inside containment
  - Passive: suppression pool
  - Active: sprays

A filter alone in the vent path will not prevent containment failure

Managing Containment – Pressure Control

- Controlled venting maintains containment function by releasing energy
- Extends time for removal of radionuclides in containment by deposition and filtering
- Maintain positive pressure to prevent buildup of a combustible gas mixture

Managing containment is not a passive function

Conclusions from Pilot

- Cooling core debris is essential
- EPRI filtering strategies can be reliably implemented
- Severe accident capable vent needed
- Enhancements identified
- Operators are already trained on use of controlled venting strategies

Performance-based framework demonstrated

Examples of Identified Plant Enhancements

- External water connection for drywell sprays (FLEX)
- Severe accident capable vent needed from both wetwell and drywell
- Control of vent
  - Operator action or engineered control system
- Possible SAMG enhancements
  - Prioritization of water injection

Performance – Based Approach

Reliable and effective filtering:

- External water injection
  - Cool core debris
  - Control drywell temperature
- Severe accident capable vent
  - Control containment pressure
  - Maximize suppression pool radionuclide filtering
  - Wetwell & drywell pathways
- Procedures and training

Broader approach required for managing containment function

Path Forward

- Require RHVs on both the wetwell and drywell
- Revise RHV to be useable and reliable in severe accidents (SECY Option 2)
- Ensure FLEX provides reliable water to drywell sprays
- Finalize engineered enhancements
- Establish performance-based guidance for implementing SECY Option 4

Acronyms

- BWR – Boiling water reactor
- FLEX – Diverse and Flexible Coping Strategy
- EOP – Emergency Operating Procedure
- SAMG – Severe accident management guideline
- EPRI – Electric Power Research Institute
- RHV – Reliable hardened vent required by EA-12-050