Protection of Power Plants from Severe Accidents and External Events

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Overarching Observations

• The nuclear community’s willingness to examine the Fukushima accident thoroughly no doubt has helped to reassure decision makers and the general public.

• The variety of independent reviews have converged on the same fundamental conclusions, which provides confidence that significant issues have not been overlooked.
Fundamental Changes Resulting From the Fukushima Accident

• There have been extensive efforts to ensure that power plants have the capacity to respond to external events.
  – Probability of occurrence is not subject to accurate prediction or control.
  – Probability of extreme events will grow over time as a result of climate change.
Fundamental Changes (cont)

• The accident has resulted in reexamination of the foundations of the safety system.
  – Design basis approach has been supplemented in the past in an ad hoc way.
  – Fukushima has resulted in immediate efforts to provide protection regardless of the initiating event.
  – Efforts are underway to amend the regulatory structure to provide an integrated approach and thereby to lower risk.
Fundamental Changes (cont)

• The accident has resulted in a change in focus for the regulatory system.
  – Traditional approach is to protect against radiation-induced health effects.
  – Fukushima reinforces importance of protection against broader societal and environmental harms.
Further Modifications of the Safety System

- Consider combinations of hazards, impacts on multiple units, and disruption of infrastructure.
- Upgrade off-site and on-site power and extend capacity to cope with a station blackout.
- Ensure availability of ultimate heat sink.
- Strengthen monitoring systems.
- Establish means to control hydrogen.
- Provide off-site resources at regional, national, or international level.
Further Modifications (cont)

- Establish a clear chain of command for accident management.
- Strengthen support for new entrant countries.
- Consider both safety and security together.
- Undertake IAEA peer reviews.
- Ensure effective regulatory framework.
Concluding Thoughts

- Set priorities for action guided by risk reduction and cost-benefit considerations.

- Acknowledge that continued vigilance and a strong safety culture are indispensable.