

Fukushima Lessons Learned

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Overarching Lessons

- Provide cooling water and power under extreme conditions when station and off-site power are unavailable
- Retain or regain access to the ultimate heat sink
- Be prepared to handle multiple units affected by the same natural hazard
- As demonstrated at Fukushima Daini, portable equipment, high-quality site leadership, and dedicated personnel are the keys to success

70% Complete on Tier 1 Requirements

35 NTF Recommendations



Tier1: 3 Orders and 2 Info Request Letters



18 Industry Guidance Documents



15,000 Discrete Plant Actions (Approx.)

NRC Orders

- Mitigating Strategies – FLEX
 - Required by end 2016
- Spent Fuel Pool level instrumentation
 - Required by end 2016
- BWR Mark I & II hardened, severe accident capable vents
 - Phase 1 required by June 2018
 - Phase 2 required by June 2019

Bias for Action

- Positioned for indefinite coping during an extended loss of AC power
- Compliance with NRC orders (as of end 2014)
 - Mitigating Strategies: 6 units completed
 - 57 more during 2015; substantially complete by end 2016
 - Spent Fuel Pool Instrumentation
 - 18 units completed; full completion by end 2016
 - BWR hardened vent order
 - On track to complete both phases by June 30, 2019
- Two national support centers in operation
 - Additional portable equipment within 24 hours
- Able to handle natural hazards affecting multiple reactors at same site

Flood and Seismic Hazards

- Seismic
 - Walkdowns and hazard re-evaluations completed
- Flooding:
 - Walkdowns and hazard re-evaluations substantially complete
- Additional discussion regarding flood and seismic hazards in following presentation

BWR Containment Filtering Strategy

- Protecting containment is the primary focus
- FLEX protects containment by core cooling
- If core damaged, vent protects containment
 - Severe accident water addition will control damaged core
- Extensive evaluations show no safety benefit from an external filter
 - Severe accident water addition will filter releases

Going Forward

- Our lessons learned from Fukushima are substantial and on-going
- 2015/16 are significant for implementation
- We have been successful when there are both industry and NRC alignment and accountability for execution
- We will achieve significant safety benefit by those actions completed by the end of 2016