Post-Fukushima
Stress tests peer review

Public Meeting

Stress Test Peer Review
Topic 1 External Events

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17 January 2012

Scope of presentation

- Overview of Fukushima event
- Preliminary Lessons Learned
- Basis for Peer Reviews

Fukushima response to earthquake

- Units 1-3 automatically shutdown in response to the earthquake
- Units 4-6 were already in outage
- The 12 (of 13) available emergency diesel generators (EDG) started up
- The earthquake caused the loss of all 6 off-site power lines

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Fukushima response to Tsunami

- First wave 46 minutes after earthquake
- All 9 sea water cooled EDG lost
- All but 1 air cooled EDG lost – for Unit 6 then 5
- Ultimate heat sink lost
- No means of communication except for one wired telephone between the on-site emergency control centre and each control room

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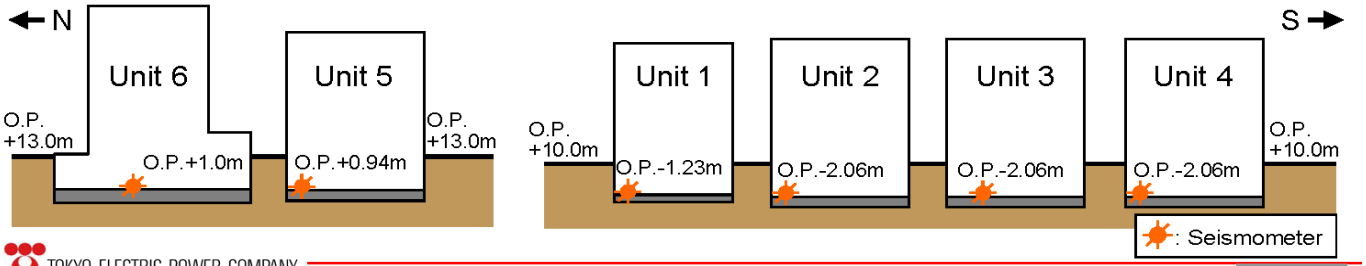
Fukushima Dai-ichi design basis

Records of Observations at Base-mat Slab of Reactor Building at Fukushima Daiichi NPS

	Maximum acceleration value from observation records (Gal)			Maximum response acceleration value (Gal)					Static horizontal acceleration (Gal)
				New design-basis seismic ground motion Ss			Original design-basis seismic ground motion		
	NS	EW	UD	NS	EW	UD	NS	EW	
Unit 1	460	447	258	487	489	412	245		470
Unit 2	348	550	302	441	438	420	250		
Unit 3	322	507	231	449	441	429	291	275	
Unit 4	281	319	200	447	445	422	291	283	
Unit 5	311	548	256	452	452	427	294	255	
Unit 6	298	444	244	445	448	415	495	500	

* □ indicates the observed value was beyond the response of Ss, the others were under the response of Ss.



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Fukushima Dai-ichi design basis

Design Basis Tsunami

- In 1967, at initial construction, the tsunami design basis was determined to be 4.0 metres
- In 2002, the tsunami design basis was revaluated and determined to be 5.7 metres
- On 11 March 2011 the actual tsunami was approximately 14 metres

Preliminary Lessons Learned

The Fukushima IAEA mission concluded

- Tsunami hazard was underestimated
- Protection should be provided against the risks of all natural hazards, and hazard assessments and methodologies should be updated in light of new information, experience and understanding
- Defence in depth, physical separation, diversity and redundancy requirements should be applied for extreme external events, particularly those with common mode implications such as extreme floods

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Stress Tests
External Events

- Earthquake
- Flood
- Extreme weather – eg wind, temperature, snow, lightning, drought

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Peer Review - External Events

- Derivation of design basis events
- Compliance and robustness within design basis
- Regulators interactions – PSR, evidence of improvement
- Assessment of robustness beyond design basis – identification of cliff edge situations and potential improvements
- Proposals for additional work identified by regulators/licensees
- Conclusions and recommendations for peer review report

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Thank You

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