

Licensing for APR1400 in Korea

May 28-29, 2018



한국원자력안전기술원
KOREA INSTITUTE OF NUCLEAR SAFETY

Agenda;

- **Overview**

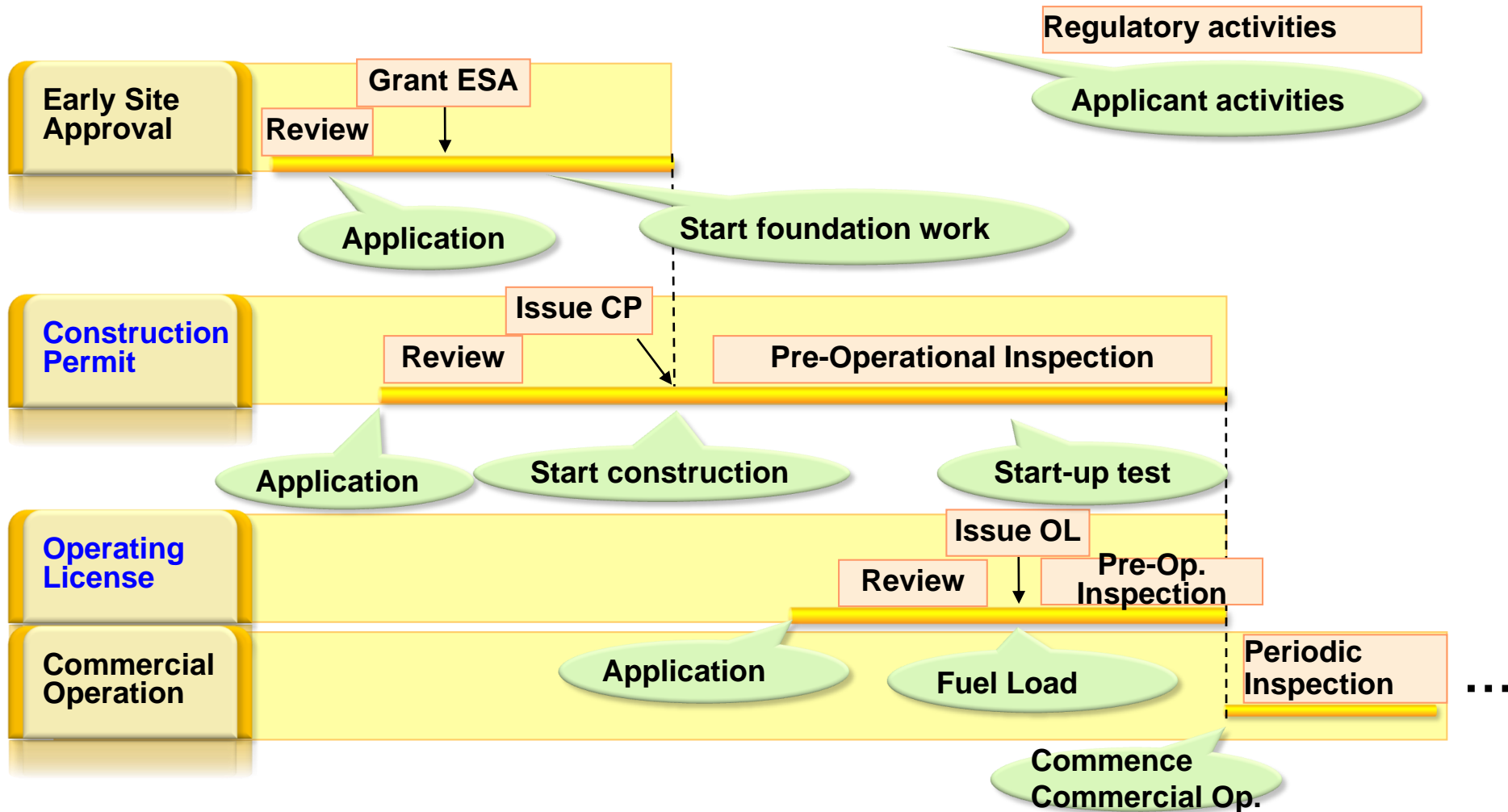
- **Licensing Status of APR1400**
 - **Shin-Kori 4**
 - **Shin-Hanul 1&2**
 - **Shin-Kori 5&6**

- **Concerns**
 - **Post Fukushima Action Items**
 - **Regulatory consideration toward new design**
 - **Public issues**



Overview

□ Licensing Process



□ **Licensing Process**

- ESA to allow the applicant to perform a limited civil engineering work of site preparation, before CP
- CP to ensure the plant design adequacy in accordance with Rules and Regulations, prior to the commencement of construction
- OL to confirm the final adequacy of plant design, installations, and operational performance

□ Licensing Process

● Pre-operational Inspection

- confirming whether the SSCs are installed and their performances are assured as designed,
- 5-phases;
 - Structure Inspection,
 - Installation Inspection of Systems and Component,
 - Cold Functional Test Inspection,
 - Hydrostatic Test & Hot Functional Test Inspection,
 - Initial Fuel Loading & Start-up Test Inspection

Overview – new reactors in Korea



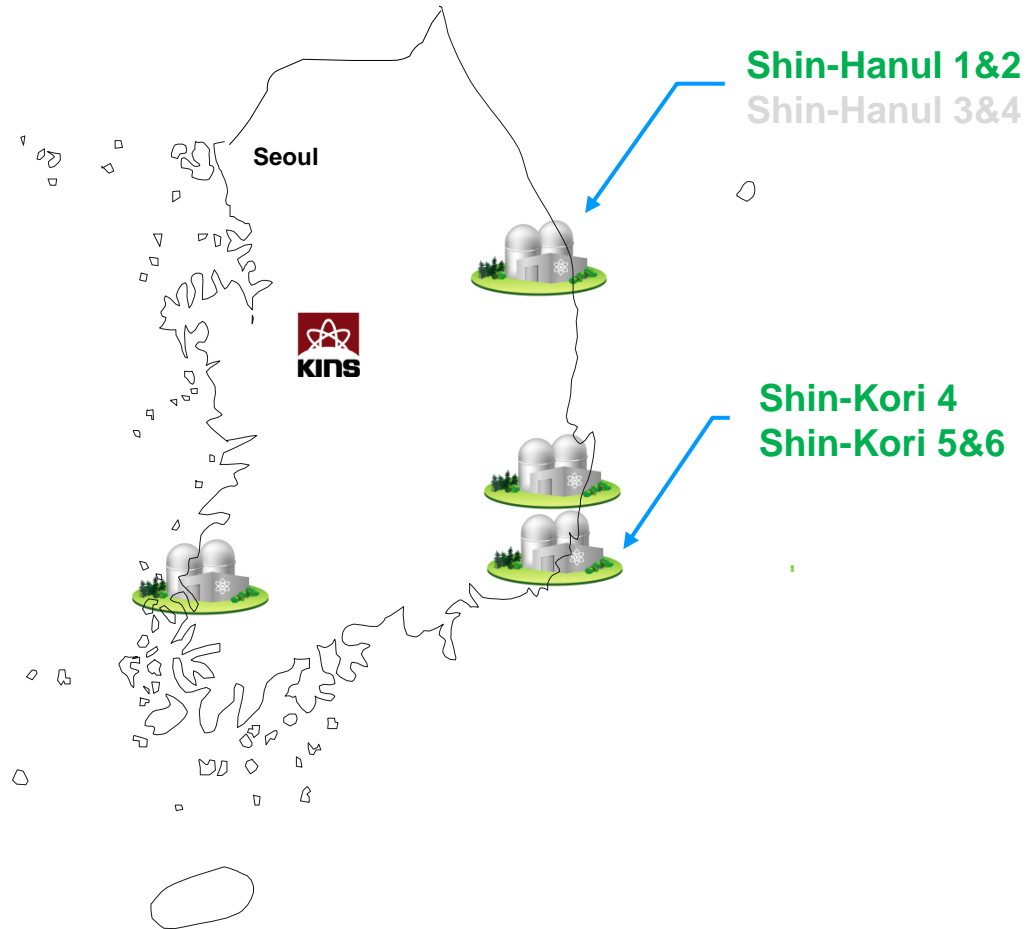
**Operating
24 Units**



**Commissioning
5 Units**



**Decommissioning
1 Units**



□ Status for New Power Reactor Licensing

- APR1400

	CP applied	CP granted	OL applied	OL granted	Commercial Operation
Shin Kori 3	2003.3	2008.4	2011.6	2015.10	2016.12
Shin Kori 4	2003.3	2008.4	2011.6	Under review	
Shin Hanul 1&2	2008.9	2011.12	2014.12	Under review	
Shin Kori 5&6	2012.9	2016.6			
<i>Shin Hanul 3&4</i>	2016.1	suspended			

□ **Shin-Kori 4**

- Record-breaking earthquake has raised safety concern.
 - Magnitude 5.8 at Gyeongju, Sep. 2016. (50km away)
 - Evaluation is needed before licensing.
- Commissioning test and Pre-operational Inspection before Operating License are finished.
- The Nuclear Safety and Security Commission will start deliberation for operation license of Shin-Kori 4.

Licensing Status of APR1400

□ Shin-Hanul 1&2

[2010.04.]



[2018.04.]



Licensing Status of APR1400

□ OL applied in December 2014

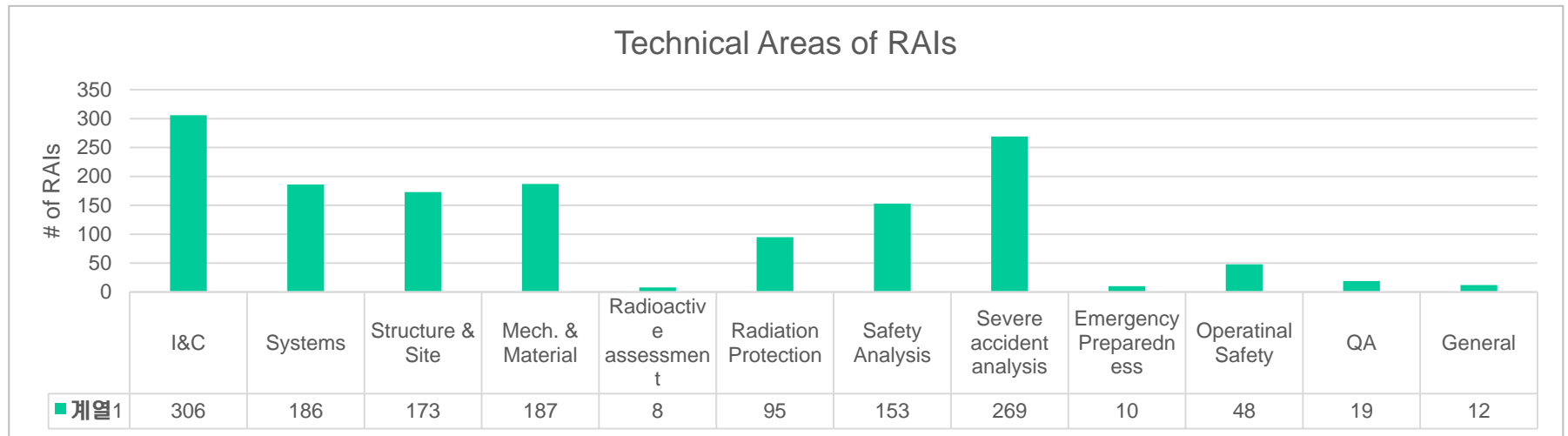
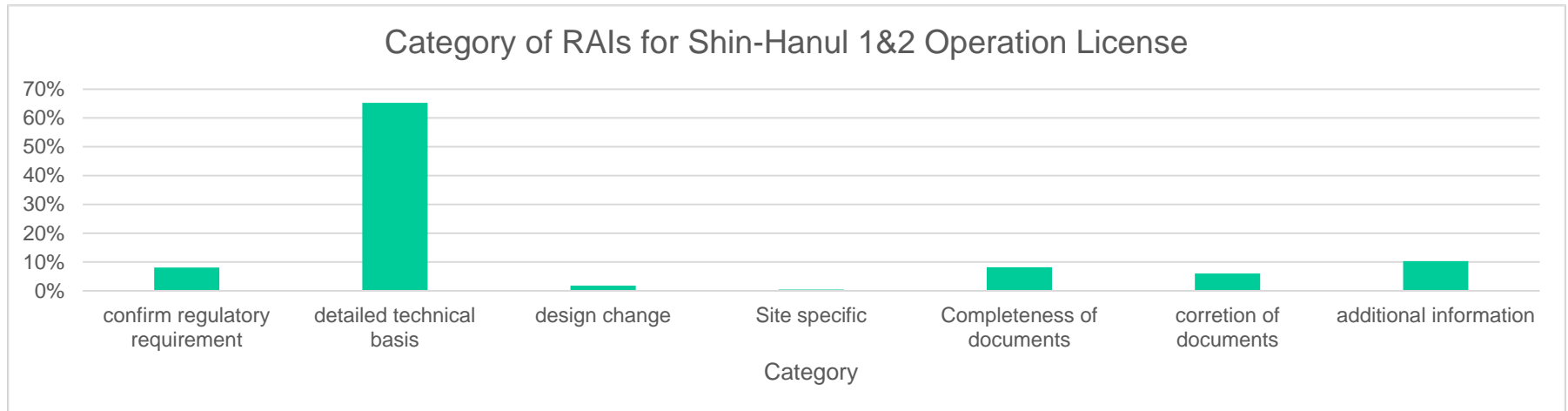
RAIs	Closed	Open Items
1,466	1,360 (93%)	106 (7%)

□ Pre-operational Inspection is being carried out since 2012 before issuing the OL.

- Site and structure (#1&2);
- Installation of SSCs(#1&2);
- Cold Functional Test(#1, #2);
- Hydrostatic Test(#1, #2);
- Hot Functional Test for SHN #1 started from Sep. 2017.

Licensing Status of APR1400

□ RAIs for safety review of Shin-Hanul 1&2



Licensing Status of APR1400

□ Pre-Operational Inspection for Shin-Hanul 1&2

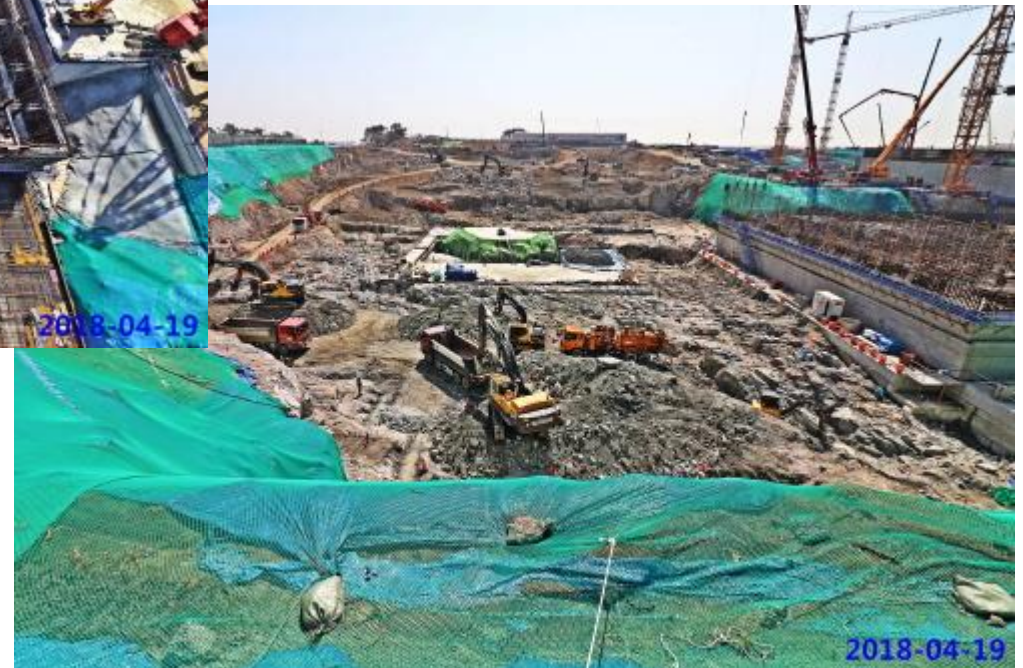
Pre-operational Inspection		schedule
Site & Structure Inspection (19)		2012.03.12. ~
Installation Inspection (55)		2013.07.01. ~
Cold Functional Test Inspection	Unit 1 (81)	2016.06.30. ~
	Unit 2 (76)	2017.05.24. ~
Hydraulic and Hot Functional Test Inspection	Unit 1 Hydraulic (2)	2016.10.31. ~ (done)
	Unit 1 HFT (29)	2017.09.07. ~
	Unit 2 (2)	2017.12.27. ~ (done)
	Unit 2 HFT (29)	To be started

Licensing Status of APR1400

□ Shin-Kori 5&6



Unit #5 (Apr. 2018)



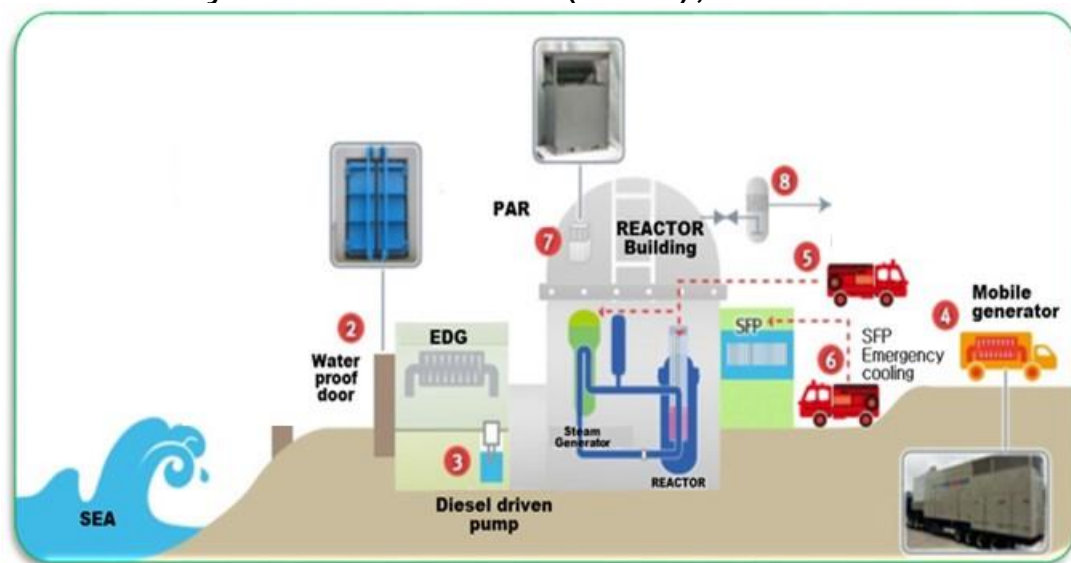
Unit #6 (Apr. 2018)

□ **Shin-Kori 5&6**

- Construction Permit issued in June 2016
- Pre-operational inspection is ongoing
- Application for Operating License expected in late 2019
- Major design changes in comparison with SHN 1&2
 - Consideration of an intentional large commercial aircraft impact
 - Installation of an AAC DG to each unit
 - Increase of the safety grade battery capacity (8 → 24 hours)
 - Installation of 4 Emergency Reactor Depressurization Valves (ERDV) against severe accidents

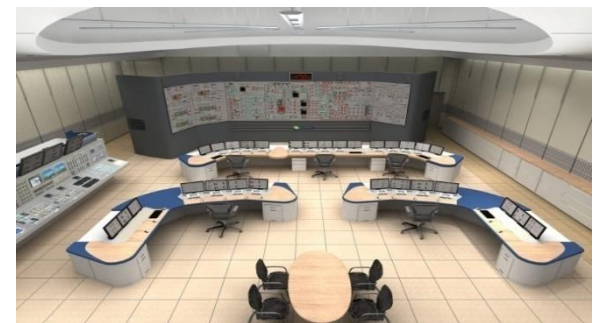
□ Post Fukushima Action Items

- confirm the safety in light of the major safety-related phenomena observed from Fukushima accident
- 33 Action items for APR1400 in Korea
 - Automatic Seismic Trip System (ASTS),
 - watertight doors and waterproof drain pumps,
 - mobile generator vehicles,
 - Installation of Passive Autocatalytic Recombiner (PAR),



- **Developing new regulatory requirements towards the advanced technologies**
 - Common Cause Failure for software based systems,
 - Safety-Security Interface,

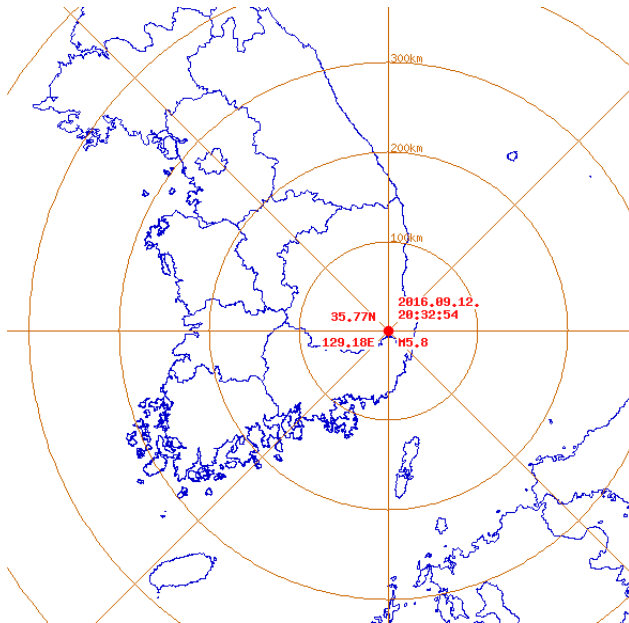
- **Commissioning Test and Oversight**
 - First of a Kind (FOAK) testing,
 - dealing with the deficiency of improper implementation or human errors during commissioning phase?



Concerns

□ Public issues with;

- Record-breaking earthquake near NPPs, 2016
- New energy policy – shift from coal and nuclear toward renewable and natural energy





Q & A

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