

APR1400 Experience in Communication with MDEP

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History of the APR1400 Development



APR1400 Status during MDEP Activity

● APR1400 DSWG

- Started with Korea, UAE, Finland and US in 2012
 - Finland dropped in 2015
 - Review design and sharing information in regulatory review, commissioning and operation stages



● In Korea and worldwide

- In Korea
 - SKN Unit 3,4 commercial operation : 2016 / 2018
 - SHN Unit 1,2 commercial operation : 2022 / 2023
 - SKN Unit 5,6 scheduled to operation : 2024 / 2025
 - SHN Unit 3,4 begin construction : 2024
- UAE Projects (Barakah 1 ~ 4)
 - Commercial operation for Unit 1,2 (2021/2022)
- Design certification in USA
 - NRC design certification : 2015 ~ 2020



APR1400 Design Specific Working Group

- Major Activities

- DSWG and Two technical experts subgroups
 - 4 Common Positions(CP) and 5 Technical Reports(TR)
 - Accident & Transient
 - Fuel Thermal Conductivity Degradation (CP)
 - Boron Dilution and Precipitation
 - Post LOCA in-Vessel debris effect (CP)
 - CHF correlation for PLUS7 fuel etc
 - Severe Accident (TR)
 - Equipment survivability
 - Hydrogen control (TR)
 - Molten Core Concrete Interaction
 - Accident management program etc
 - Finding and corrective action items in Commissioning
 - POSRV
 - Feed water flow measurements

APR1400 MDEP Working Group

- **Major Activities**

- Good practice for enhancing safety : Post LOCA in-Vessel debris effect.
 - KHNP provide the issue related design information through MDEP
 - Debris generation/transport and strainer testing.
 - Question on bypass test method arised in the course of developing MDEP common position on the issue.
 - Additional test performed for assurance of conservatism.
 - Conservatism reviewed by KINS.
 - Reviewed results were shared among the MDEP members.

Benefits from MDEP

- **Benefits**

- provide opportunities of
 - Regular communication channel between regulatory and vendor.
 - Sharing up-to-date licensing information and issues : Vendor can incorporate them into the development of new reactor design.
 - Sharing regulatory position on current licensing issues.
 - Sharing best practices on design review and license process.
- Facilitate regulatory review and understanding vendor's design
- Provides platform for informal discussion of important technical issues and different regulatory philosophy
- Pave the way toward global convergent regulatory frame.

Lesson learned from MDEP

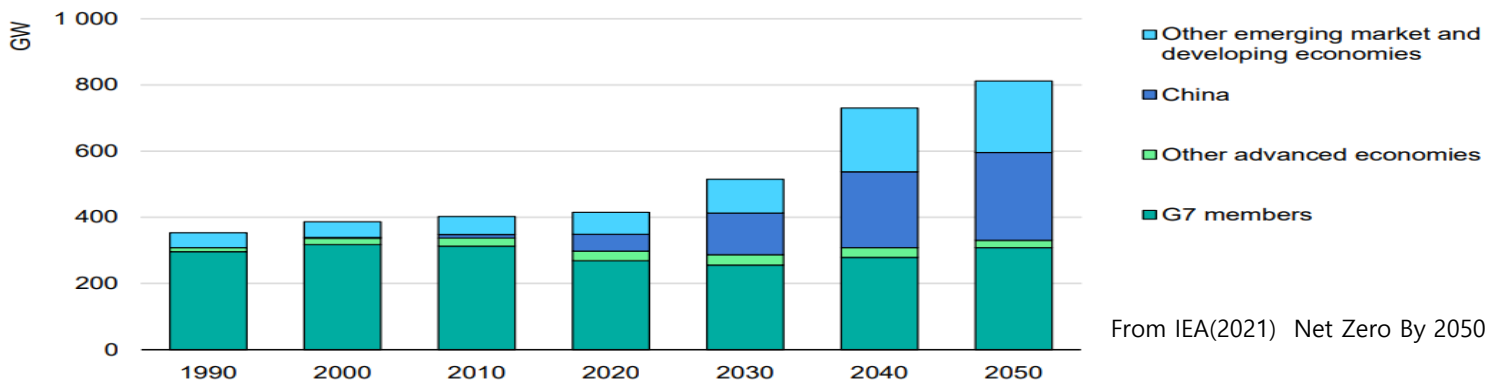
- Lesson learned

- Harmonization of regulation from different
 - Code and standard (IEEE vs IEC, ASME vs KEPIC)
 - Safety philosophy (safe design vs over design)
- Harmonization of regulation lead to cost effective regulation, reduce design change, and ultimately enhance investment for new build.
- MDEP common position paper made through information sharing is important to achieve converged regulation.

Comments for the Future

- Timeline proposal for future new design build
 - Recommendation on the best timing : standard design stage
 - Licensing concerns are the key factors for the new reactor development.
 - Vendor can take into account the critical licensing issues before the design fixed.
- Information exchange among advanced countries and newly embarking countries will help safe NPP operation.

Nuclear power capacity by country/region in the Net Zero Emissions by 2050 Scenario



- KHNP will support MDEP to enhance safety of global NPP operation.