Update of SMART Cooperation for Deployment in Saudi Arabia

April 24, 2018

Keung Koo Kim
I. SMART Development
Advanced Integral PWR
for Electricity Generation and District Heating or Desalination

- Thermal: 365 MWt
- Electricity: 100 MWe
- Fresh Water: 40,000 t/day
Chronology of SMART Development


- Conceptual Design ('97.7~'99.3)
- Basic Design ('99.4~'02.3)
- Construction of prototype SMART ('02.7~'06.2)
- SMART Pre-Project Service ('06.7~'08.11)
- Standard Design Approval ('09.1~'12.7)
- R&D to Incorporate Fukushima Action Plan into Design ('12.3~'16.2)

- Standard Design
- Technology Validation
- Licensing Review
World’s Unique and Largest Full Scope Accident Simulation
- 1:1 Height, 1/49 Volume
SMART ITL (Integral Test Loop)
SMART-MCR Simulator

Alarm On

Operator

Supervisory Operator

Instructor
II. SMART Characteristics
Enhanced Reactor Safety: No LBLOCA
SMART Construction

SMART 1&2 UNITS
(System-integrated Modular Advanced ReacTor)

Korea Atomic Energy Research Institute

King Abdullah City for Atomic and Renewable Energy
III. SMART Partnership with KSA
**SMART Partnership**

**Technology Development**

**Korea**

**SMART Development**
- SMART Standard Design
- Technology Validation Licensing
- Safety Enhancement for Post Fukushima Action Plan

**1997 ~ 2015**

**Korea & KSA**

**Pre-Project Engineering**
- FOAK Engineering Design
- K.A.CARE HCB
- PSAR

**3 Yr**

**KSA**

**FOAK Plant Construction**
- 2 FOAK Plants Construction
- Licensing (CP, OL)

**5~6 Yr**

**Design Documents**
FOAK Engineering Design for SMART

- Project Period: 2015.12 ~ 2018.11 (3 Years)
- Work Scopes
  - Reactor System Design
  - Fuel Design
  - Balance of Power Design
  - Main Component Design and Validation

Human Capacity Buildup for KSA Engineers

- CRT-Basic, CRT-Technical, OJT and OJP
- 41 Experts

The First Phase for SMART Partnership Cooperation
Royal-Commission Yanbu

SMART Construction Site

~ 50 KM
SMART HCB for KSA

- **CRT-Basic (CRT1):** *Completed*
  - 3 Months on Nuclear Engineering Fundamentals
    - 12/June ~ 23/June/2016 (2 Wks) at Riyadh
    - 18/July ~ 23/Sept/2016 (9 Wks) at KAERI

- **CRT-Technical (CRT2):** *Completed*
  - 3 Months on SMART Design Fundamentals
    - 26/Sept ~ 23/Dec/2016 (13 Wks)

- **OJT:** *Completed*
  - 6~12 Months on SMART Design
    - 16/Jan/2017 ~ 22/Dec/2017

- **OJP:** *Ongoing*
  - 6~17 Months for SMART PPE Design Participation
The IAEA Milestones Approach for Nuclear Power Infrastructure Development
Can a country, especially small country, establish all necessary infrastructure by itself?

- Licensing and Regulation
- Operation and Maintenance
- Technical support and Emergency preparedness,
- Education and Training, Supply…

**SMR Project Needs a New Deployment Model**

→ Multilateral Collaboration Model
To support countries who don’t have enough infrastructure

Based on the SMART Partnership between ROK and KSA
- Major Role for Core Service

Run by SMART Owners Group with International Support
- Shared Core Service
  - Maintenance
  - Training and Education
  - Licensing Support
- Country-wise Total Solution
IV. Summary
SMART is Ready for Deployment.

- Advanced Small Size Modular Reactor
- All Technologies Implemented in SMART had been proven through Comprehensive Technology Validation Program

SMART Partnership Cooperation with KSA

- SMART@KSA will be the lead plant for Global SMART
- Multilateral collaboration model
Thank you