Global Challenges in New Build Applications
Status of AP1000 Projects

Mike Corletti
Director, UK AP1000 Technical Integration and Licensing
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AP1000 Plant – Key Attributes

Proven Technology and Innovative Passive Safety Systems

Passive safety replaces mechanical and electrical systems – harnesses natural forces like gravity, convection, and condensation to achieve safe shutdown.

Delivery Certainty
Standard design, experience from current projects and modular construction enable “n-th of a kind” delivery performance.

Regulatory Certainty
Reviewed by multiple countries; first Generation III+ reactor to receive design certification from the U.S. NRC.
AP1000 Plant: Safe, Simple and Standardized

• **Passive safety** replaces mechanical and electrical systems – harnesses natural forces like gravity, convection and condensation to achieve safe shutdown

• **Strong licensing pedigree** based on reviews in multiple countries; first and only Generation III+ reactor to receive design certification from the U.S. NRC

• **Simplified design and modular construction** provide a plant that is easier and less expensive to build, operate and maintain
Passive Safety Through Proven Technology

**Passive Safety-Related Systems**
- Use “passive” processes only, no active pumps, diesels, ....
- One-time alignment of valves
- No support systems required after actuation
- Greatly reduced dependency on operator actions

**Active Defense in Depth-Related Systems**
- Reliably support normal operation
- Redundant equipment powered by onsite diesels
- Minimize challenges to passive safety systems
- Not necessary to mitigate design basis accidents

*Severe accident scenario effects are mitigated by in-vessel retention of the melted fuel*

The **AP1000** plant is designed to reduce or eliminate the chances of a core meltdown and explosion in situations where the plant experiences a total loss of power, similar to the accident at Fukushima.
The AP1000 PWR: Designed for Greater Project Certainty and Shorter Schedule

Modular construction means more work done in parallel

Factory production of modules

Transport Modules

On-site module assembly

Plant Operation

Plant Order

Site Survey and Preparation

Site Construction

Construction and module assembly

Shorter schedule – increased safety – improved quality

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AP1000 Plant Modular Construction
An Innovative Approach Unique in our Industry

Improved Quality Control and Efficiency
Reduced Construction Schedule and Optimized Costs
Eight AP1000 units under construction
  – Four units in China (Sanmen and Haiyang)
  – Four units in the United States (Vogtle and V.C. Summer)

Establishing delivery improvements from eight units worth of experience
Sanmen Site Progress: Time Lapse View 2009 to 2016

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China Projects Recent Achievements

- Completed four Reactor Coolant Pump (RCP) installations at Sanmen 1 (fourth completed on March 1)
- First two RCP installations completed at Haiyang 1 on March 23 and 25; second set of RCPs delivered April 5 and installed on April 26
- Completed Cold Hydro Test at Sanmen 1 on May 26
The Path to Completion:
Next Milestones for Sanmen and Haiyang

- RCP Deliveries/Installations
- Cold Hydro Test
- Hot Functional Test
- Fuel Load
- 100% Power Operation

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U.S. Projects Updates

Vogtle Unit 3 Containment – March 2016

Vogtle 4 Turbine Building – February 2016

V.C. Summer 3 Shield Building – February 2016

V.C. Summer Site – Fall 2015

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U.S. Projects Recent Achievements

• V.C. Summer
  ➢ Unit 2 Shield Building layer F1 wedge concrete placed in February
  ➢ Unit 2 Annex Building – concrete placed for two of three base slab sections in March
  ➢ Unit 3 CA20 Part 1 lift and set completed in March

• Vogtle
  ➢ Unit 3 Annex Building concrete placed in March
  ➢ Unit 3 concrete fill of CA20 module completed in March
  ➢ Unit 3 Shield Building concrete fill inside panels completed in March
EUR confirms the AP1000 plant can be **successfully deployed** in Europe (May 2007)

AP1000 plant amended design **approved** by NRC (December 2011)

UK regulators grant **Interim Design approval** (December 2011) – **Final Approval** planned March 2017

China licencing activities on-track, with **Final Safety Analysis Report** (FSAR) submitted to customer (2012)

Combined construction and operating licences (COL) approved for **Vogtle 3&4** site (February 2012) and **V.C. Summer 2&3** site (March 2012)

Canada (CNSC) Phase 2 Pre-Licence (2013)
Progress of Moorside Project: Adapting a Proven Delivery Model

- Maximise standardisation/minimise customisation of the AP1000 plant design to achieve delivery certainty
- Project adaptation in progress
  - Vogtle reference plant
  - Regulatory-driven change
  - 50 Hz incorporation
  - EU/UK/owner/site requirements
  - Product/delivery improvements from eight units worth of experience
- Generic Design Assessment (GDA)
  - Intensive effort focused on reaching convergence and closing out GDA issues
  - Scheduled to receive Design Acceptance Confirmation/Statement of Design Acceptability by March 2017 from HMG
QUESTIONS???