Licensing of UK ABWR in an international environment

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Dave Watson
Senior Regulatory Advisor, Nuclear Power Project, Hitachi Europe Ltd.
Hitachi introduced Boiling Water Reactor (BWR) technology to Japan, building on US experience, in the 1950s.

BWR technology has since been developed through successive generations of design – with construction more-or-less continual from 1970s to now.

Design evolution during this time has culminated in the Advanced Boiling Water Reactor (ABWR).

The UK Advanced Boiling Water Reactor (UK ABWR) is proposed for deployment in the UK, and Hitachi-GE is seeking regulatory design approval – a Design Acceptance Confirmation (DAC) and Statement of Design Acceptability (SoDA) for the design.
ABWR Overview

- Benefits from proven construction and operating experience – safe, reliable and cost competitive
- Proven design: 4 operational, 4 under construction
- 4 units constructed on time and on budget in Japan
- Simplified systems with high operability
- UK ABWR design includes latest international developments, as well as refinements to meet specific UK conditions – but remains an ABWR.
- World-class safety features
Safety features of the UK ABWR

- Defence in depth design– multiple safety trains and back-ups
  - Core cooling: diverse methods of cooling water supply
  - Containment: multiple layers – fuel cladding, RPV and RCCV
  - Control: control rods fast acting to shut down the reactor plus back-up liquid control system
- Enhanced C&I system & HWBS
- Aircraft impact protection
- Extreme hazard protection from independent Back-up Building

Visit our website and view the UK ABWR safety video: http://www.hitachi-hgne-uk-abwr.co.uk/reactor-safety.html
Fukushima Countermeasures

Lessons learnt from Fukushima include:

**Earthquake Protection:** Seismically qualified buildings

**Site layout:** Elevated site plus option to site backup buildings on raised ground

**Protection of core facilities:** Watertight buildings and doors around backup features

**Loss of cooling and loss of off-site power:** Additional diverse and independent methods of power supply and core cooling

Visit website for further information on Fukushima learnings: [http://www.hitachi-hgne-uk-abwr.co.uk/reactor-safety.html](http://www.hitachi-hgne-uk-abwr.co.uk/reactor-safety.html)
UK ABWR Update - GDA

- Generic Design Assessment (GDA) is a challenging review by UK nuclear regulators
- Examines safety, environmental protection, security
- Takes significant effort

- Transparent process – reports published plus a public comments process
- Aim is to complete assessment while design is still ‘on paper’
- A number of design changes have been made to meet UK regulatory expectations
UK ABWR Update – site deployment

- GDA target completion is end of 2017
- Horizon Nuclear Power (a 100% Hitachi subsidiary) has plans to deploy the UK ABWR at Wylfa Newydd and Oldbury-on-Severn.
- Will be twin units at each site
- Nuclear Site Licence application made
- Working to build UK domestic expertise – University seminars and support for BWR research hub
Influences of International Licensing

- BWRs are deployed in many countries worldwide.
- Licensing by different regulatory regimes has undoubtedly contributed to design development and safety improvement.
- ABWR has undergone regulatory assessment in 4 countries.

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Influences of MDEP

- MDEP has existed for around 10 years
- There is a design specific ABWR working group – this helps the regulators share information and learn from each other
- We believe MDEP does influence the UK regulator – and in turn that has an influence on their assessment as we progress through GDA
- No doubt that MDEP is positive for getting international regulators to work more closely together
- This is helping encourage common approaches (eg MDEP Common Positions) which will ultimately encourage international harmonisation of approaches for new reactor assessment.
- Hitachi-GE support further work to harmonise international regulation of new reactors.
Summary – UK ABWR licensing in an international environment

- BWR technology has been developed through successive generations of design – with construction more-or-less continual from 1970s to now
- Design evolution during this time has resulted in the proven Advanced Boiling Water Reactor (ABWR)
- Generic Design Assessment for UK ABWR target is to complete end 2017
- ABWR design has been influenced by international developments e.g. introduction of Fukushima learning and aircraft impact protection
- Hitachi-GE believes international cooperation via MDEP benefits regulation of new nuclear power plants
- Hitachi-GE supports the MDEP initiative and encourages continued progress on international harmonisation of approaches to regulation