Smartly Leveraging Past Work

Doug McDonald

GE Hitachi Nuclear Energy

GAIN Gateway for Accelerated Innovation in Nuclear

Doug McDonald - Biography

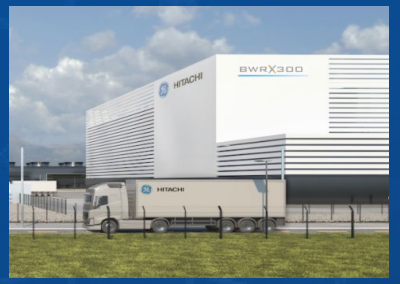
BWRX-300 Product Manager

GE Hitachi Nuclear Energy

Responsible for the technical aspects and delivery of BWRX-300, GE Hitachi's innovative, cost competitive small modular reactor. He has over 34 years of experience including 32 with GE/GE-Hitachi. He has served in a variety of technical and leadership positions including research reactor operations, design of GEN III/III+ reactors, commissioning of ABWRs, project management, quality, business development and sales. He has a B.S. in Nuclear Engineering from Texas A&M University and a Masters in Mechanical Engineering from The University of California, Berkeley. He holds patents in severe accident mitigation devices and passive mixing technology.

GEH Rich History of Nuclear Innovation

Proven success turning vision into commercial-scale reality, on time and on budget



OVER 80 YEARS OF NUCLEAR EXPERIENCE AND INNOVATION

1939	1955	1957	1962	1974	1986	1994	1997	2014	2019	2021
First GE involvement in nuclear physics	GE Atomic Division established	Vallecitos BWR AEC License #1	Nuclear Power Demo achieves full power	25th BWR Peach Bottom 3	50th BWR River Bend	PRISM Preapp. SER	ABWR DCD	ESBWR DCD	BWRX-300 1st LTR	ABWR DCD Renewal Expected

67 reactors licensed in 10 countries

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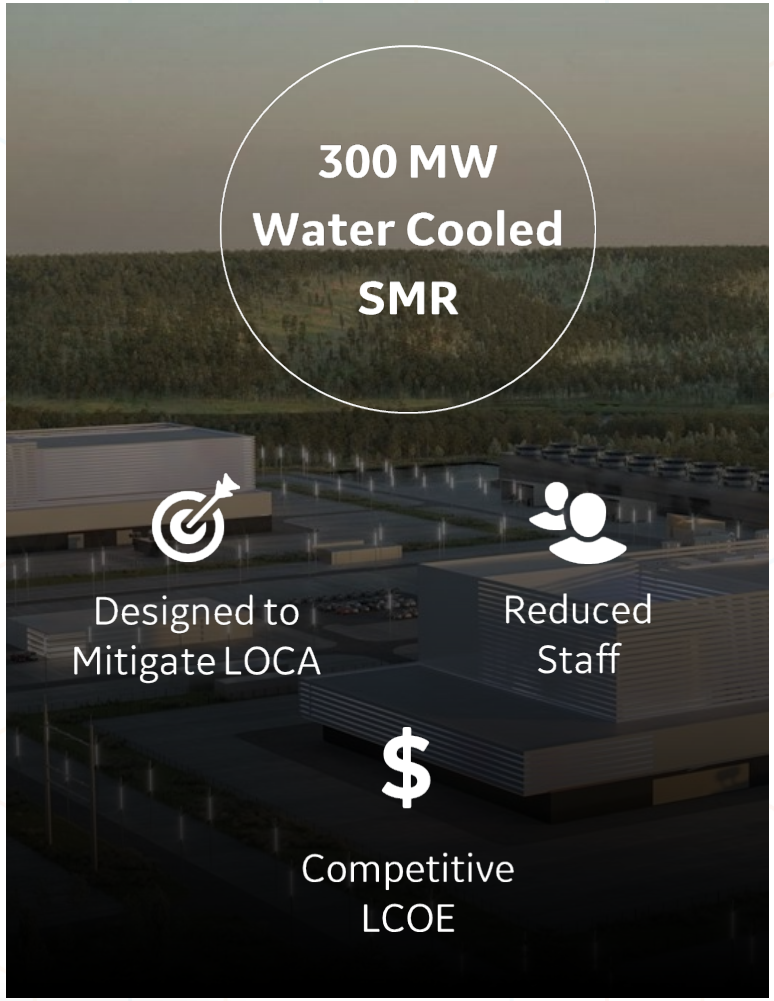
BWRX-300 Small Modular Reactor

- 10th generation Boiling Water Reactor
- Leverages U.S. NRC licensed ESBWR
- Design-to-cost approach
- Significant capital cost reduction per MW
- World class safety
- Capable of load following
- Ideal for electricity generation and industrial applications, including hydrogen production
- Constructability integrated into design
- Licensing interactions in the U.S. and Canada
- Operational by 2028



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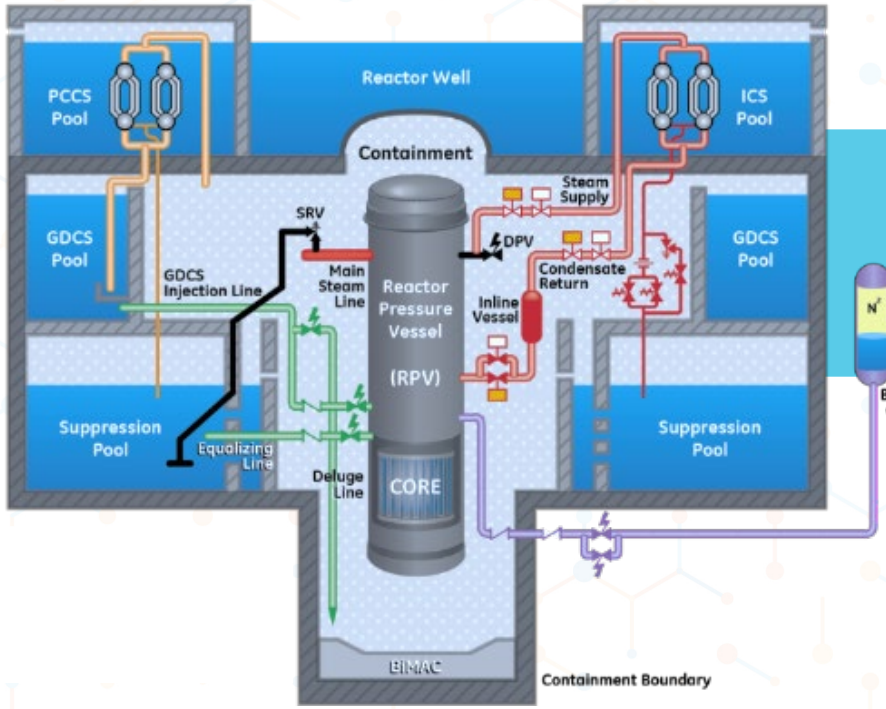
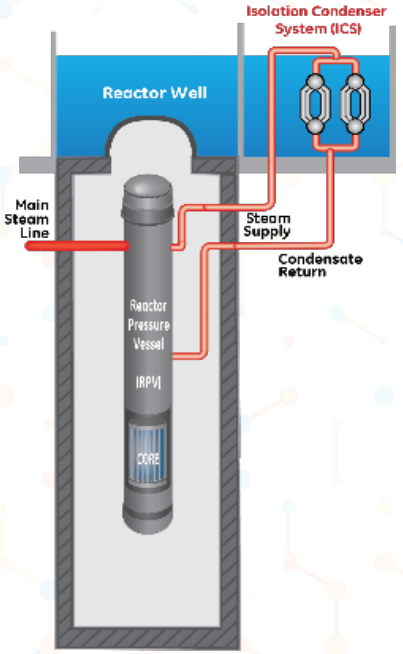
Simplicity Drives Cost Reduction

ESBWR



90% volume reduction

BWRX300



Systems/components eliminated:

- Suppression Pool
- GDCS Pool
- Safety Relieve Valves & Spargers
- Depressurization Valves
- BiMac (core catcher)

Systems/components simplified:

- Passive Containment Cooling (PCCS)
- Containment (use of SC)
- Boron injection
- Security (built into design)
- Turbine
- Generator (air cooled)

>50% building volume reduction/MW
>50% less concrete/MW

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Utilizing proven technology

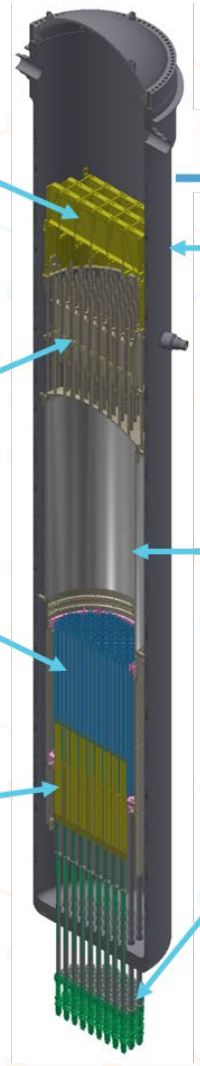
PROVEN COMPONENTS, PRIOR TESTING, AND OPERATIONAL HISTORY GREATLY ACCELERATE DEPLOYMENT

Dryer
Same features as ABWR* and ESBWR …
Same as upgrades for existing fleet …
Size nearly identical to KKM**

Steam separators:
Same as ABWR* and ESBWR …
Similar to others in the BWR fleet

GNF2 fuel:
>19,000 bundles delivered …
Utilized by ~70% of BWR fleet

Control rod blades:
Same as ABWR* …
Longer than ESBWR …
Almost identical to latest design for BWR fleet



Reactor pressure vessel:
Same material and fabrication processes as ABWR*, ESBWR and many of the BWR fleet …
Diameter almost identical to KKM**

Chimney:
Uses ESBWR and Dodewaard*** technology … Simplified

Fine motion control rod drives:
Same as ABWR* and ESBWR

* ABWR fleet has combined 22+ years of operating experience | ** Kernkraftwerk Mühleberg (KKM): 355 MWe BWR/4 in operation since 1972 | *** Dodewaard: 58MWe natural circulation BWR, 1969 ~ 1997

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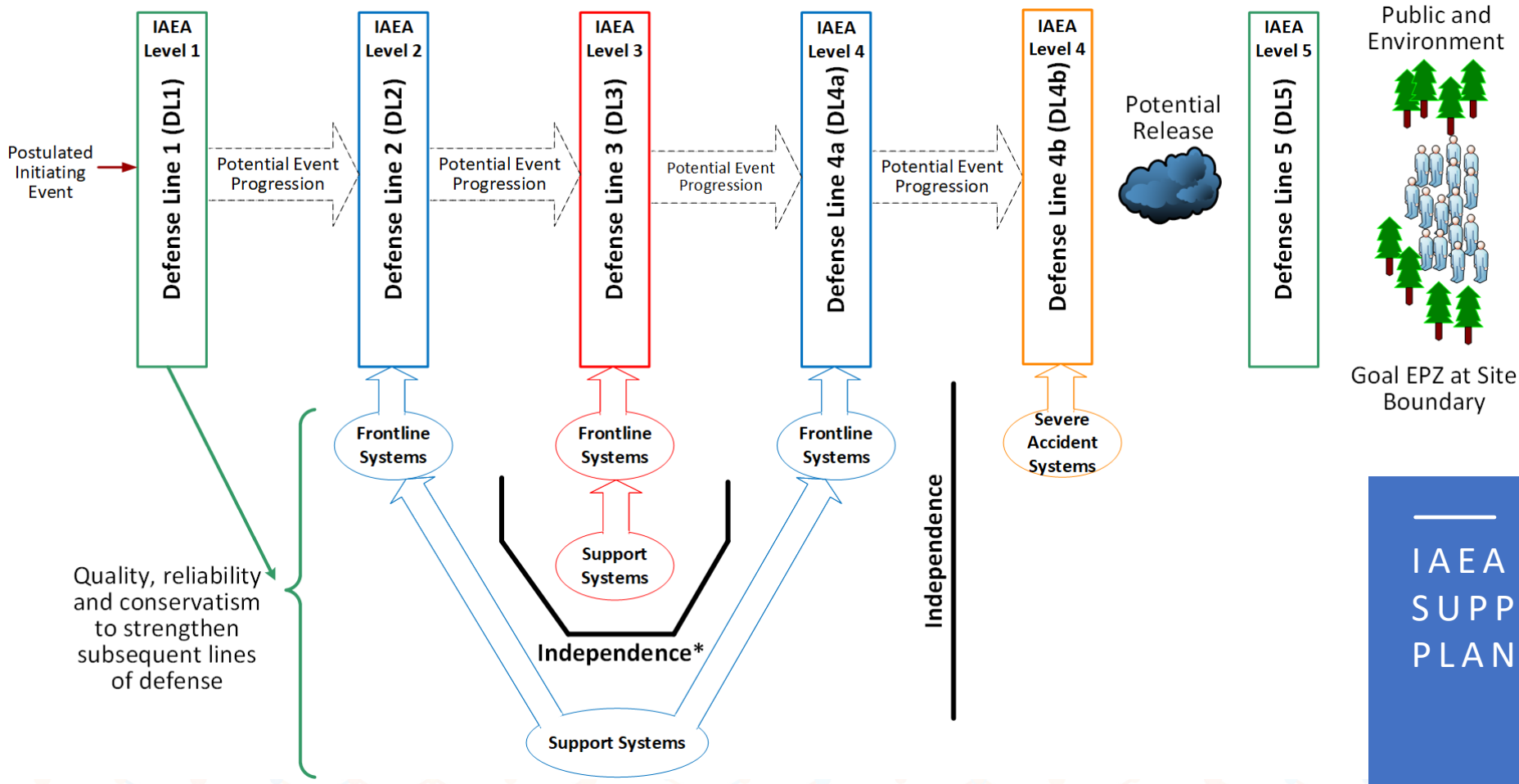
Defense in depth … safety by intelligent design



IAEA GUIDELINES SUPPORT STANDARD PLANT GLOBALLY

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BWRX-300 US Licensing Approach

- Utilize ESBWR DCD and LTRs for analytical methods, testing bases and fundamental operational characteristics
- Utilize licensing and operational history of GNF2 fuel
- Reduce licensing risk with LTRs
  - RPV Isolation and Overpressure Protection, final SER Nov 2020
  - Containment Performance, final SER Jan 2021
  - Reactivity Control, final SER Jan 2021
  - Containment Evaluation Method, RAIs underway
  - Advanced Civil Construction and Design Approach, Acceptance Letter Mar 2021
- Part 50 for first unit(s) in US
- Part 52 potentially after first unit(s)

International Markets

- Strong interest internationally … need for fleets in late 2030s
- Europe carbon tax
- Desire for commonality
  - ✓ ASME Section III
  - ✓ IEC
  - ✓ Regulators starting to working together … NRC/CNSC/ONR, NRC outreach to other countries, initial joint reviews
  - ○ Standard safety assessment framework … IAEA guidelines
  - ○ Standardized license submittals and approvals

Questions?

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