



NRC Commission Meeting

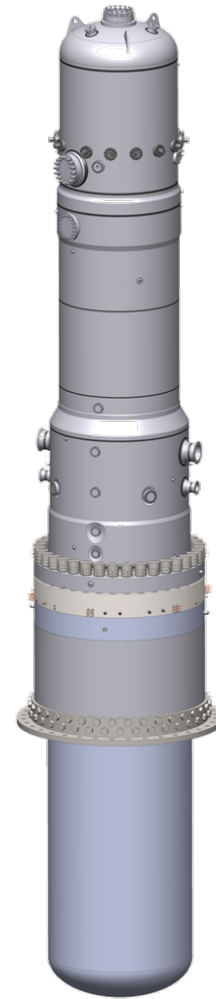
Christofer Mowry

President – Babcock & Wilcox Nuclear Energy, Inc.

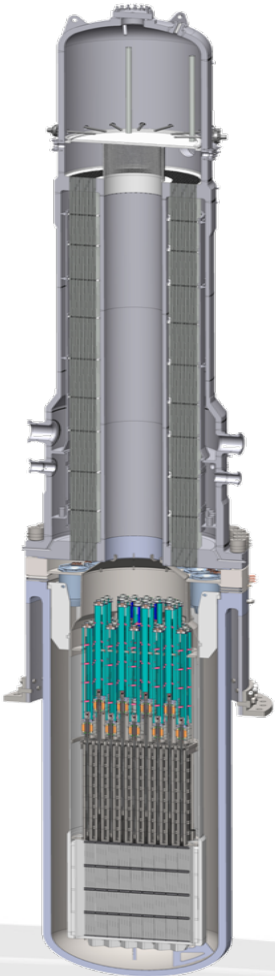
Chairman – Generation mPower, LLC

29 March 2011

- **Robust safety design**
- **Strong development progress**
- **Continued industry support**



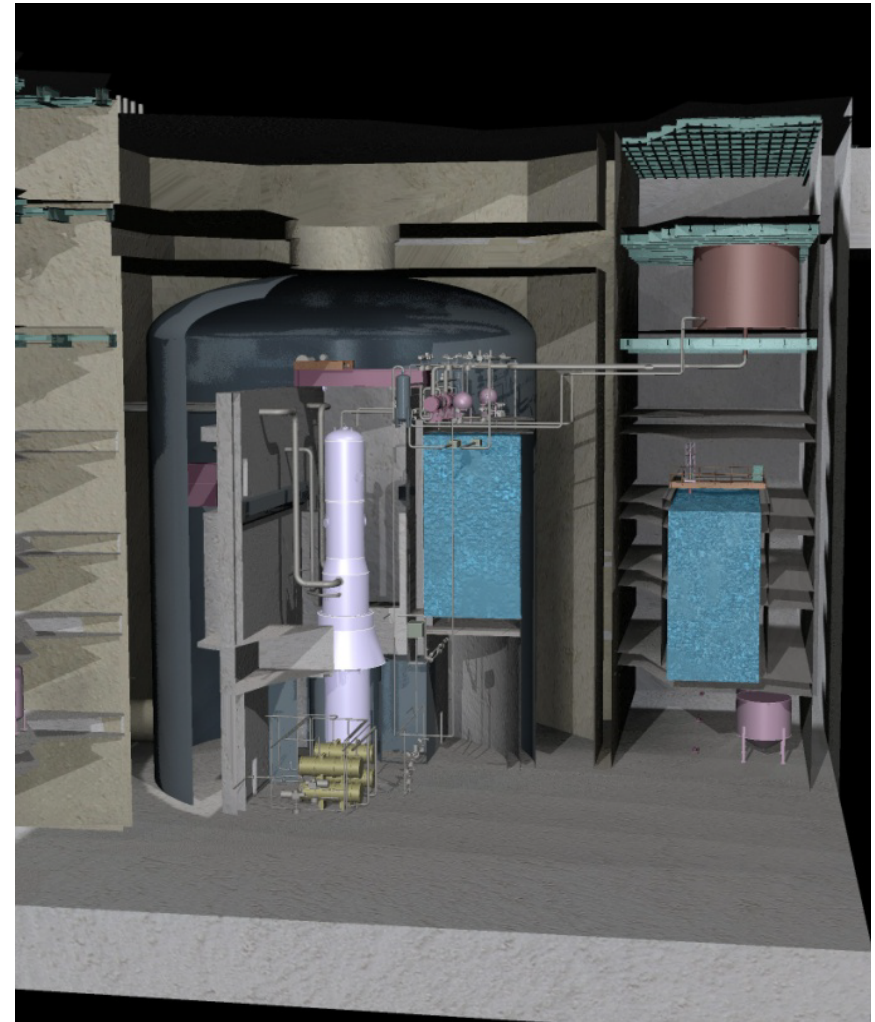
Reactor Design Overview



- **425 MWth nominal output per mPower module**
 - Enables complete factory manufacture and testing
 - Small core (69 fuel assemblies) and source term
- **Integral NSSS with no large primary system penetrations**
 - Internal Steam Generator
 - Internal Reactor Coolant Pumps
 - Internal Control Rod Drive Mechanisms
 - Internal Pressurizer
- **Inherently robust safety performance**
 - No penetrations below core height (mid-flange)
 - Large reactor coolant inventory compared to power (0.21m³/MWth)
 - No core uncover during design basis accident (SB-LOCA)
- **“Standard” PWR Fuel with solid experience base**
 - 17x17 with less than 5% enriched U²³⁵
 - Less severe services environment (FIV, power density, temperature)
- **Simplified reactor operations**
 - 4+ year fuel cycle with complete core replacement
 - No soluble boron system for reactivity control

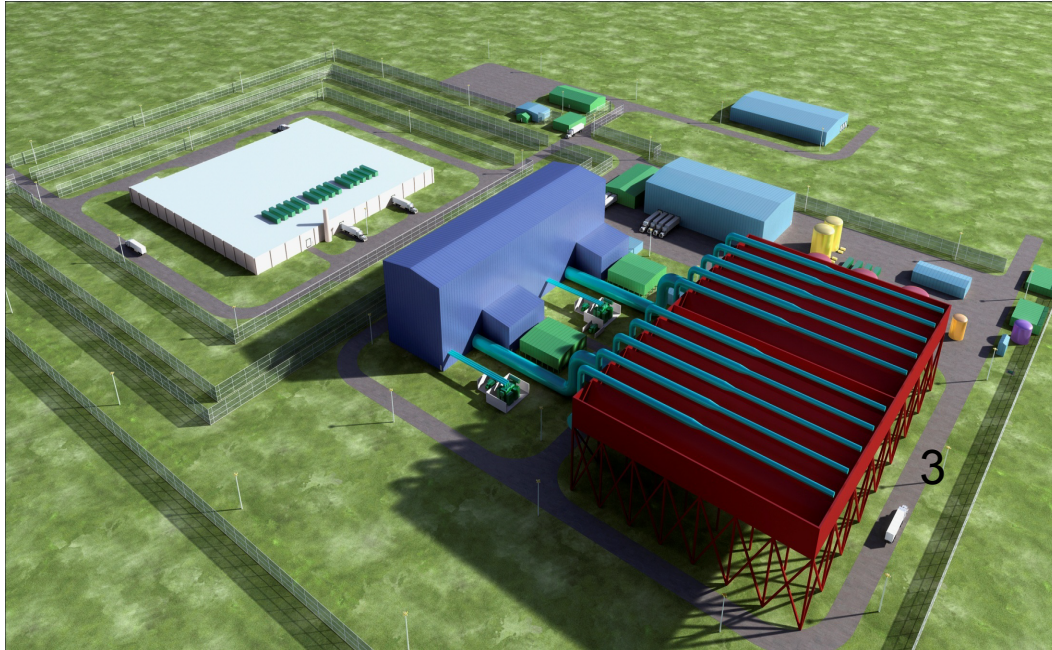
Integral PWR with few primary system penetrations

- **Deeply embedded concrete reactor building**
 - Contains all water sources – RWST, UHS
 - Isolates all safety equipment from environment
- **Fully underground steel containment**
 - Favorable seismic response
 - Inherent aircraft crash & missile protection
- **Fully protected Spent Fuel Pool**
 - Located in auxiliary containment
 - Large volume supports extended SBO response
- **Inherently safe systems and features**
 - Gravity-powered ECCS
 - Dry containment with no debris entrainment
 - Dedicated safety-systems with no sharing
- **Significant Severe Accident mitigation**
 - Passive filtering
 - Passive hydrogen recombiners
 - NSSS water jacket capability



Risk informed design targets 10^{-8} CDF with fewer, inherently safe systems

Innovating a More Efficient Plant Architecture



- Standard 250 MWe “Twin Pack”
- Security-informed layout
- Isolated reactor building
- Small site footprint (42 acres)
- Air or water cooled condenser
- Simple, single-train BOP
- Digital I&C with defense-in-depth
- Modular systems manufacturing
- 3-year construction schedule

“The shape of the future” ... simple, practical, flexible

Component Prototyping and Tests

- Reactor Coolant Pump
- Control Rod Drive Mechanisms
- Fuel Mechanical Testing
- CRDM/Fuel Integrated Test
- Fuel Critical Heat Flux
- Emergency Condenser

Integrated Systems Test

- Heat Transfer Phenomena
- Steam Generator Performance
- LOCA Response
- Pressurizer Performance
- Reactor Control



Dedicated mPower facility ... backbone of \$100M testing program

2010 Submittals

- ✓ Quality Assurance Program Plan
- ✓ Critical Heat Flux Testing
- ✓ mPower Design Overview
- ✓ Integrated Systems Test Program
- ✓ Core Design Methodology
- ✓ Instrument Setpoint Methodology
- ✓ CRDM Design and Development
- ✓ Physical Security Design Concept

Planned for submission in 2011

1. mPower Design Overview (Rev. 1)
2. IST Program Plan (Rev. 1)
3. Physical Security Design (SGI)
4. Risk-informed DCA Scope WP
5. Source Term & Dose Calculations
6. Fuel Assembly Mechanical Design
7. Operational Programs and Staffing
8. Aircraft Impact Assessments
9. Offsite EP Requirements
10. HFE/HSI Program Plan
11. Reactor Coolant Pump Design & Testing
12. Analysis Codes and Methodology

More than 300 FTEs working on mPower ... continued NRC support essential

Protection against “Fukushima-type” Events

Events and Threats	B&W mPower Design Features
Earthquakes And Floods	<ul style="list-style-type: none"> • Seismic attenuation: Deeply embedded reactor building dissipates energy, limits motion • “Water-tight” : Separated, waterproof reactor compartments address unexpected events
Loss of Offsite Power	<ul style="list-style-type: none"> • Passively safe: AC power, offsite or onsite, not required for design basis safety functions • Defense-in-depth: 2 back-up 2.75MWe diesel generators for grid-independent AC power
Station Blackout	<ul style="list-style-type: none"> • 3-day batteries: Safety-related DC power supports all accident mitigation for 72 hours • APU back-up: Auxiliary Power Units inside reactor building recharge battery system • Long-duration “station keeping”: 7+ day battery supply for plant monitoring/control
Emergency Core Cooling	<ul style="list-style-type: none"> • Gravity, not pumps: Natural circulation decay heat removal; water source in containment • Robust margins: Core power density (11.5kW/m) and small core (425MWth) limit energy • Slow accidents: Maximum break small compared to reactor inventory ($4.7 \times 10^{-5} \text{m}^2/\text{m}^3$)
Containment Integrity and Ultimate Heat Sink	<ul style="list-style-type: none"> • Passive hydrogen recombiners: Prevention of explosions without need for power supply • Internal cooling source: Ultimate heat sink inside underground shielded reactor building • Extended performance window: Up to 14 days without need for external intervention
Spent Fuel Pool Integrity and Cooling	<ul style="list-style-type: none"> • Protected structure: Underground, inside auxiliary containment, located on basemat • Large heat sink: 30+ days before boiling and uncovering of fuel with 40 years of spent fuel

Multi-layer defense ... mitigates extreme beyond-design basis challenges

“We believe that SMRs ... can play an important role in future power supply portfolios as a carbon-free, base load generation option. We look forward to our continued participation in the Generation mPower Industry Group.”

Mike Price, EVP and COO - Oglethorpe Power Co.

“As the supplier ... to the less densely populated areas of Arkansas, AECC strongly supports the development of ... the B&W Generation mPower design.”

Sandra Byrd , VP- Arkansas Electric Cooperative Corp.

“Generation mPower is in our national best interest ... the only advanced design developed solely in the U.S., thereby contributing to ... energy diversification and independence.”

Kyle Nelson, COO - Sunflower Electric Power Corporation

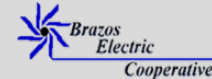
“Hoosier Energy continues to support ... SMR technology. Generation mPower is an advanced design with passive safety ... far superior to ... existing nuclear power plants.”

Robert Hill, Hoosier Energy, Inc.

Generation mPower Industry Consortium



Hoosier Energy Rural Electric Cooperative, Inc.



Nebraska Electric G&T Cooperative



Associated Electric Cooperative Inc.



Industry Advisory Council

Includes Consortium members above plus:

- | | |
|----------------------|-----------------|
| AEP | Bruce Power |
| Dayton Power & Light | Dominion |
| Duke Energy | Entergy |
| Exelon | MidAmerican |
| NPPD | Progress Energy |
| Vattenfall | |

Continued broad and strong industry support for mPower