Approved: March 19, 2010
Date

MINUTES OF THE HOUSE ENERGY AND UTILITIES COMMITTEE

The meeting was called to order by Chairman Carl Holmes at 9:10 a.m. on March 11, 2010, in Room 785 of the Docking State Office Building.

All members were present except:
Representative Dan Johnson- excused
Representative Margaret Long - excused
Representative Mike Slattery - excused

Committee staff present:
Matt Sterling, Office of the Revisor of Statutes
Cindy Lash, Kansas Legislative Research Department
Iraida Orr, Kansas Legislative Research Department
Artur Bagyants, Kansas Legislative Research Department
Renae Hansen, Committee Assistant

Conferees appearing before the Committee:
Mike Shepard, Babcock and Wilcox

Others attending:
Twenty-three including the attached list.

Presentation on:

Modular Nuclear Energy

Clare Guston, Sunflower Energy, introduced the speaker from Babcock and Wilcox.

Mike Shepard, Babcock and Wilcox, (Attachment 1), spoke to the committee on their involvement in modular nuclear energy. He gave a historical overview of Babcock and Wilcox in relationship to the energy industry in the United States. He noted that they moved into this area of business because they were looking for a new niche to build energy construction projects. Mr. Shepard spent a considerable amount of time explaining how they decided to include this type of energy production in their business plan. He noted that the beginnings for this system began in the nuclear powered submarines. Additionally the military were putting money into the potential development of independent base energy production. Mr. Shepard noted that one of the key things they were looking at in their design was safety. The design they came up with is a 125 Megawatt unit that could be transported from the production plant to the energy site using the existing traditional rail system. He commented that this could be used to complement the Kansas' growing wind energy production. Because the system is totally put underground, the security of the plant is much safer than existing large nuclear power plants. Normal time for the construction cycle for this type of plant is about 36 months compared to the traditional time of 44-45 months for traditional power plants. These plants are designed to produce energy for about 60 years. He also noted that the price of the transmission lines needed for this size of power plant would be only a half a million dollars a mile compared to the $1 to $1.5 million dollar mile for bigger plants. He commented that the regulatory process for this size of plant has to be reevaluated. They believe they have repackaged existing technology for nuclear energy in an innovative way.

Questions were asked and comments made by Representatives: Don Myers, Milack Talia, Vern Swanson, Tom Sloan, Tom Moxley, and Carl Holmes.

The next meeting is scheduled for March 16, 2010.

The meeting was adjourned at 10:40 a.m.

HOUSE ENERGY AND UTILITIES COMMITTEE
GUEST LIST

DATE: March 11, 2010

NAME	REPRESENTING
Joe Dick	KCBPU
Michael Shepherd	B&W
Kyle Nelson	Sunflower Electric
Clare Gustin	Sunflower Electric
Mark Schreiber	Westar
Judith Gadd	Capitol Advantage/NextEra
Mike Murray	NextEra Energy
Scott Jones	KCPL
Doug Smith	SEPC
Susan Duffy	KCC
Phil Wages	KEPCo
Larry Berg	Midwest Energy
Kimberly Svaty	GSPA
Nelson Krueger	PAR Electric
Tom Day	KCC
Dave Holthaus	KEC

babcock & wilcox modular nuclear energy

B&W mPower™
a progressive energy solution

A practical, scalable, modular ALWR

B&W Modular Nuclear Energy, LLC

 General Overview 02-26-10

babcock & wilcox modular nuclear energy

B&W mPower™ Overview

- Favorable regulatory, geopolitical and market realities
- Broad B&W capabilities, workforce and American infrastructure
- Strong nuclear utility interest, with commitments
- Practical design, aligned to existing nuclear infrastructure
- Robust licensing philosophy, facilitating NRC review

Complementary, near-term nuclear energy solution

 General Overview 02-26-10 2

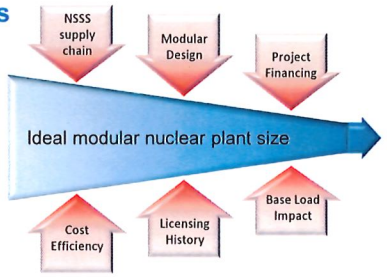
HOUSE ENERGY AND UTILITIES
DATE: 3/11/2010
ATTACHMENT 1-1

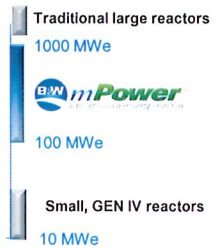
babcock & wilcox modular nuclear energy

A Shifting Nuclear Landscape

Geopolitical Motivators

- Climate Change legislation
- Energy independence
- Strained supply chain
- Field craft labor availability
- Transmission capacity
- Water and land rights
- Tight capital markets





One size does not fit all …

 General Overview 02-25-10 3

babcock & wilcox modular nuclear energy

Today's Industry Imperatives

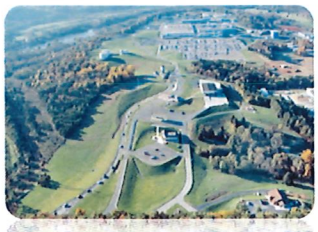
- Don't "bet the company" on one project
- Practical, proven technology
- Utilize existing nuclear infrastructure
- "Repower" carbon-intensive facilities
- Incremental power additions

 General Overview 02-25-10 4

babcock & wilcox modular nuclear energy

Vertically Integrated Supply Chain

- Domestic forgings or rolled plate
- Component fabrication
  - Mt. Vernon, Indiana
  - Barberton, Ohio
  - Cambridge, Ontario, Canada
- Fuel fabrication
  - Lynchburg, Virginia
- Control rod drive fabrication
  - Euclid, Ohio



A North American solution … manufactured in existing B&W facilities

 General Overview 02-26-10 5

babcock & wilcox modular nuclear energy

Leading the Energy Transformation

McDermott International

J. Ray McDermott

The Babcock & Wilcox Company

B&W Technical Services Group, Inc.

B&W Nuclear Operations Group, Inc.

B&W Power Generation Group, Inc.

B&W Nuclear Power Generation Group, Inc.

B&W Modular Nuclear Energy, LLC

Clean Power Technologies
High-Consequence DOE Operations
Advanced Engineering and Manufacturing

 General Overview 02-26-10 6

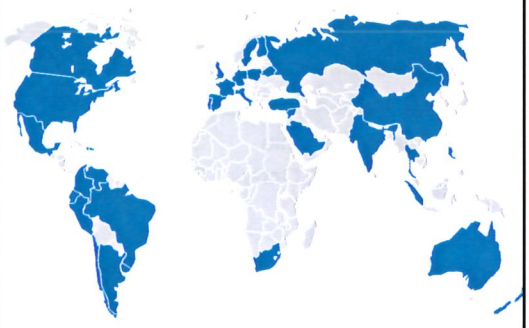
1-3

babcock & wilcox modular nuclear energy

A Global Business

B&W Nuclear Experience

- 50+ years of continuous nuclear engineering and manufacturing
- 12,000 nuclear professionals
- Only U.S. NRC Category 1 license
- Only U.S. company with N-Stamp for NSSS vessel manufacturing
- Fabricated >1,100 NSSS components and pressure vessels
- Manufactured more than 260 steam generators worldwide
- U.S. nuclear manufacturing in Indiana, Ohio, Virginia



$4.7B sales. $6.7B* backlog. 23,300 employees. 32 countries.*

** Approximate equivalent 2008 revenues, including unconsolidated operations*

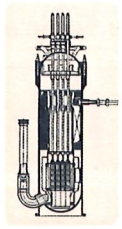
 General Overview 02-26-10 7

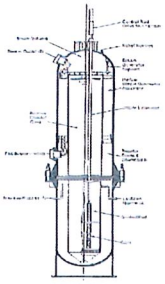
babcock & wilcox modular nuclear energy

B&W Early Integral PWRs

Designed and fabricated NSSS NS Savannah

Consolidated nuclear steam generator NS Otto Hahn





SMPP design

- B&W has evolved the integrated Nuclear Steam Supply System PWR over 50 yrs.
  - **NS Savannah:** Designed in 1950s; small PWR with standard design
  - **NS Otto Hahn:** Designed in 1960s; small integrated steam generator with reactor
  - **SMPP:** Designed in 1980s; small modular plant developed for land-based military electric generation

More than 40-year legacy of developing integrated NSSS

 General Overview 02-26-10 8

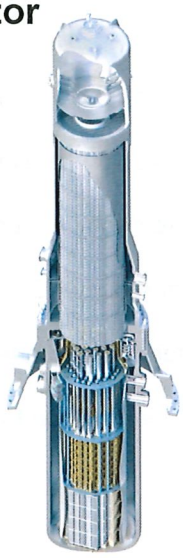
1-4

babcock & wilcox modular nuclear energy

A Generation III++ Reactor

- Integral 125 MWe modular reactor
- Proven Advanced Light Water Reactor technology
- Simple, passively safe design
- Utilizes "industry standard" PWR fuel
- 48-60 month operating cycle between refueling
- Built in North America, in B&W factories

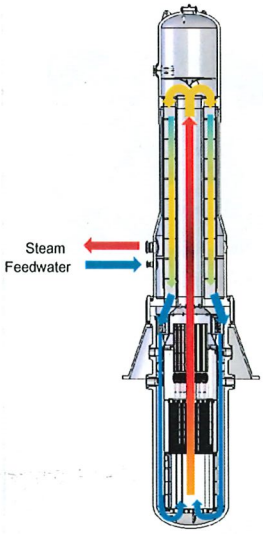
B&W mPower a progressive energy solution



 General Overview 02-25-10 9

babcock & wilcox modular nuclear energy

B&W mPower Integral Reactor Design



- Primary coolant contained within integral reactor vessel
- Forced circulation with internal non-safety pumps
- "Load-following" capability
- Power and pressure control with feedwater, active pressurizer
- Simple B&W once-through steam generator, with superheat

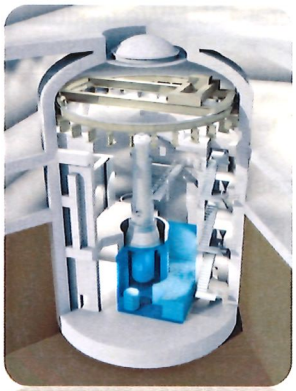
Thermal Power:	425 MW
Reactor Coolant:	1900 psia nominal 568°F Core inlet 609°F Core outlet 25.4 Mlbm/hr
Steam Conditions:	571°F @ 825 psia (50°F Superheated) (Feedwater @ 325°F)
Reactor Vessel:	Inside Diameter 10 ft Height 76 ft
Fuel Assemblies:	17x17 fuel pin array 80 in active length

 General Overview 02-25-10 10

babcock & wilcox modular nuclear energy

Nuclear Island Features

- Dry containment - no suppression pool
- No active core cooling systems
- Passive decay heat removal
- No emergency AC power – batteries only
- Reactor installed after construction
- Spent fuel storage for 60-year plant life



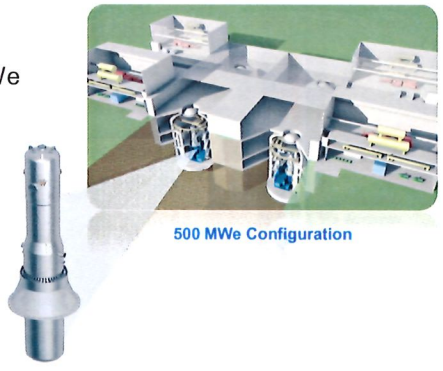
Simple integrated safety features

 General Overview 02-26-10 11

babcock & wilcox modular nuclear energy

Scalable Nuclear Plant: Practical, Affordable

- Fully independent reactor modules
- 1-8 modules per plant, 125-1,000 MWe
- Underground containment building
- Low-impact, air-cooled condenser
- Scalable to grid, site, load-growth
- Three-year construction schedule



500 MWe Configuration

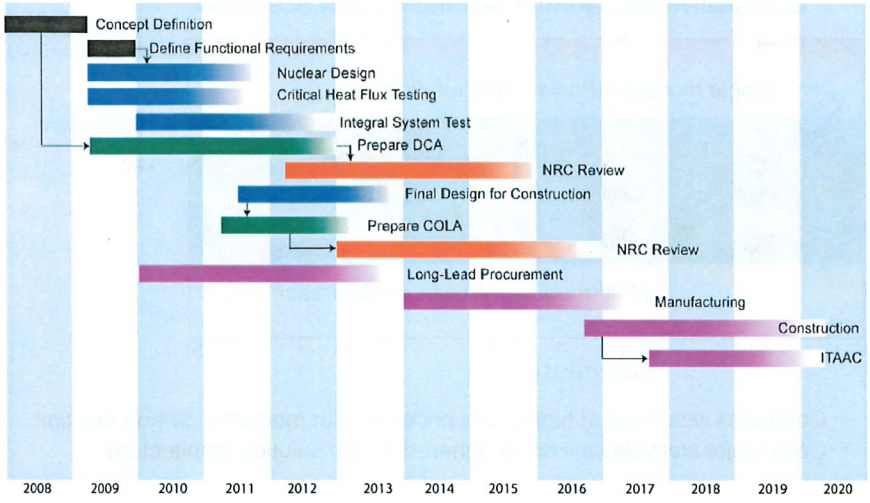
Cost certainty … Schedule certainty … Capital efficient.

 General Overview 02-26-10 12

1-6

babcock & wilcox modular nuclear energy

B&W mPower Lead Plant Schedule



 General Overview 02-25-10 13

babcock & wilcox modular nuclear energy

Cost Factors

- 36-month construction
- NSSS factory built
- 60-year underground fuel storage
- Small transmission investment
- 4-year+ fuel cycle
- Air cooled condenser – water rights/permits
- Target 10-day refueling outage
- Utilizing existing domestic fuel fabrication capabilities
- Facility design features with O&M cost focus

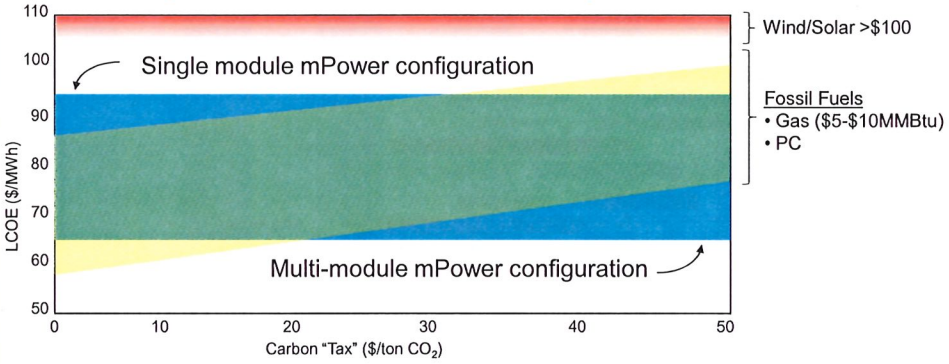
Focused on O&M costs, LCOE … not just initial capital costs

 General Overview 02-25-10 14

babcock & wilcox modular nuclear energy

mPower Business Case

Competitive with alternatives under many scenarios …



- Competes with fossil at higher fuel prices or with moderate carbon taxation
- O&M major lifecycle cost driver, inherent to the solution architecture

Expanding the view on Lifecycle Cost… Addressing O&M drivers now

 General Overview 02-25-10 15

babcock & wilcox modular nuclear energy

Licensing

- Policy/Regulatory Issues Affecting SMRs
  - NRC annual fees, Price-Anderson, Decommissioning funding
  - Offsite emergency preparedness requirements
  - Staffing requirements
  - Multiple modules at one site
  - Fuel cycle/operating cycle – ISI/IST interval
  - ITAAC
- B&W Pre-Application Activities
  - July 7 and October 27 meetings with NRC – next meeting in March
  - Gain additional NRC confidence thru confirmatory testing and PIRT
  - Series of topical reports on key issues for NRC review
  - Excellent support from NRC management and staff – a dedicated LPM

Significant Congressional and DOE Support

 General Overview 02-25-10 16

1-8

babcock & wilcox modular nuclear energy

B&W mPower Value Proposition

- Flexible … sized to local transmission, site, and power requirements
- Affordable … cost competitive, cost certainty with incremental financing
- Practical … reduced site work and existing B&W U.S. manufacturing
- Proven … established licensing with Generation III++ technology

1-9