



U.S. Nuclear Power Industry

The Renaissance

“Back to The Future”



OVERVIEW



- **Background**
 - '70s ~ '80s
 - '90s ~ Now
- **Renaissance**
- **Consortiums**
- **Licensing / Reactors / NPP Applications**
- **Organizations / QM Initiatives**
- **Quality Professionals – Opportunity**
- **Conclusion**



1970s ~ 80s



- **Construction – 126 NPP – 2 Step Licensing Process**
- **Continued Environmental / Safety Protests**
- **Three Mile Island – U.S. Industry Accident**
 - Loss of Public Support and Confidence
 - Changing NRC Licensing Requirements
 - Cost Overruns
- **Chernobyl Accident – 1986**
- **Shoreham NPP (\$5.5 Bil) > Sold \$1.00**
 - Fully Decommissioned in 1994 – Never Operated
- **1980 > NPP's Cancelled & No New NSSS Orders**
- **1985 > NRC Publishes NUREG-1055**

1990s ~ Now



- **104 U.S. Operating NPPs**
- **INPO Standards on Continuous Improvement**
- **No New Orders “New Build”**
- **First Generation Operations Workforce**
 - Aging / Retirement
 - Operations Expertise Not Design Build
- **Qualified / Certified Supply Chain Vanished**

Renaissance



- **Carbon Emissions / Oil Dependence**
- **2005 Energy Act**
 - Loan Guarantees
 - First Six NPPs
- **Passive Reactor Technology**
- **Public Perception Change**
- **10CFR Part 52 – 1 Step Licensing Process**

Consortiums



- **NuStart Westinghouse & Shaw Group**
 - AP-1000
 - Duke, Southern, Progress Energy, TVA, Others
- **UniStar AREVA & Bechtel**
 - EPR
- **GEH & URS Washington Division**
 - ESBWR
- **MHI & URS Washington Division**
 - US APWR

10 CFR Part 52 - Licensing 1 Step



- **Standard Design Certification (DCD)**
 - Westinghouse Nuclear 2005
- **Combined Operating License (COLA)**
- **Early Site Permits (ESP)**
- **Inspection, Test, Analysis and Acceptance Criteria (ITAAC)**

GEN III+ Reactor Designs (GEN IV)



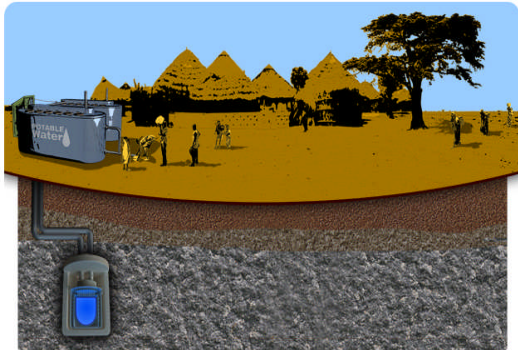
- **PWR AP-1000 Advanced Passive Safety Systems**
 - Westinghouse Nuclear
- **EPR European Pressurized Water Reactor**
 - AREVA
- **ABWR Advanced Boiling Water Reactor**
 - GE / Hitachi
- **ESBWR Economically Safe Boiling Water Reactor**
 - GE / Hitachi
- **US APWR Advanced Pressurized Water Reactor**
 - Mitsubishi Heavy Industries

Small Modular Reactors



- **Hyperion Power Generation**

- Los Alamos – 25 mw



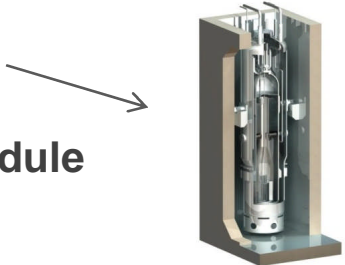
- **Babcock and Wilcox**

- 125 mw (U.S. Navy Supplier)



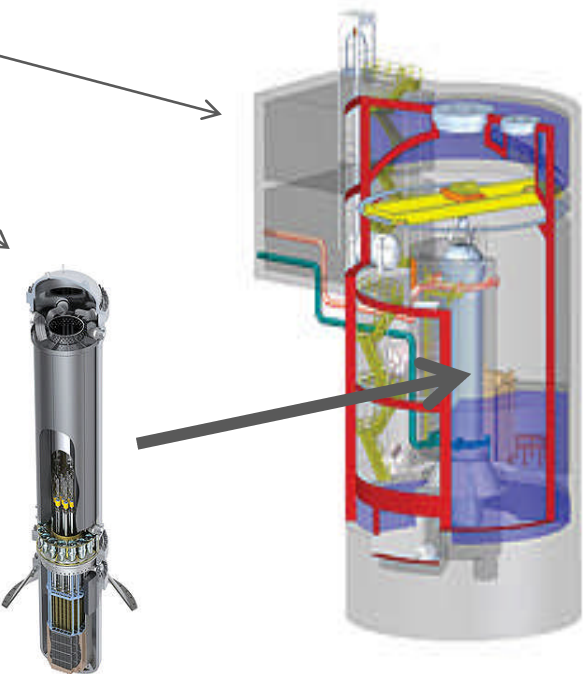
- **NuScale Power**

- 45 mw Multi-Module



- **Sandia National Laboratory**

- 100 mw



NPP Applications



- **2007** **5 COLAs**

- **2008** **12 COLAs** **1 Anticipated**

- **2009** **2 Anticipated**

- **2010** **3 Anticipated**

- **Total COLAs 23**

- **Total Units 34**

U.S. Industry Organizations



- **American Nuclear Society**
 - ANS www.ans.org
- **Nuclear Energy Institute**
 - NEI www.nei.org
- **Institute for Nuclear Power Operations**
 - Industry Members
- **Electric Power Research Institute**
 - Industry Members

NEI Quality Initiatives



- **QA Topical – Standard Template**
- **QA Role in the ITAAC Requirements**
- **Commercial Grade Dedication**
- **Fraudulent / Counterfeit Items**
- **Qualified Supplier Shortages**
- **Lessons Learned / Training – NUREG-1055**
- **Quality Professional Development (Shortage)**
- **Standards for CAPs**

“Call For” Quality Professionals



- **Workforce – NPP Operations-based**
- **Quality Professionals**
 - NEI Nuclear Workforce Study Results
 - Quality Had Highest % Rate Over 48 Years of Age (75%)
- **4,000 ~ 6,000 New Professionals Needed**
 - 30 NPP x 120 = 3,600 Construction / Suppliers
 - 30 NPP x 20 = 600 Utility Oversight
 - 60 New Suppliers = 300 for Supplier Quality

“Call For” Quality Professionals



- **Consultants – Assist with Development / Deployment**
- **Quality Professionals – Utilities**
 - Operations / Construction / Supply Chain Management
 - Quality Engineering / Supplier Evaluations
 - Commercial Grade Dedication
- **Quality Professionals – EPC / Suppliers**
 - Design / Fabrication / New Build
 - Planning / Surveillance / Audits / Inspections / Testing

Conclusion



- ***2010 New Era in Power Generation***
- ***Leverage from Technology Breakthroughs***
 - ***Nuclear Must be in the Mix***
 - ***Advanced Reactors / Safeguards***
 - ***3D Modeling / Software***
- ***Need YOU > Next Generation***
 - ***Great Opportunity for Quality Professionals***
- ***Accelerate Supply Chain Development***
- ***Know The Requirements Well***

Companies set sights on UAE nuclear project worth \$41B

Local and international companies reportedly are setting up offices in Abu Dhabi to be part of a civilian nuclear-power project in the United Arab Emirates that could generate about \$41 billion over the next decade.

A U.S. commercial nuclear energy mission, which would be coordinated by the Nuclear Energy Institute and the U.S.-UAE Business Council, is scheduled to visit the UAE in December.

The visit aims to build and expand relationships with UAE civilian suppliers, contractors and potential partners.

Emirates Business 24/7 (United Arab Emirates) (10/18)

Road to Clean Energy Independence



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Focus on Quality

Now Biff – I said Two Coats !!