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Deploying Game-Changing Technology

2013 Regulatory Information Conference
March 12, 2013
Peter Hastings

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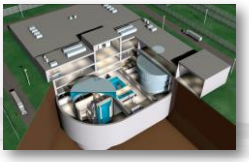
DOE Selects mPower America Project

- Demonstrates SMR innovation … near-term
- Teams B&W, TVA, Bechtel, and DOE
- TVA Clinch River (CR) deployment by 2022
- Includes design and licensing of mPower SMR
- DOE award announced November 2012
- Cooperative Agreement goal March 2013



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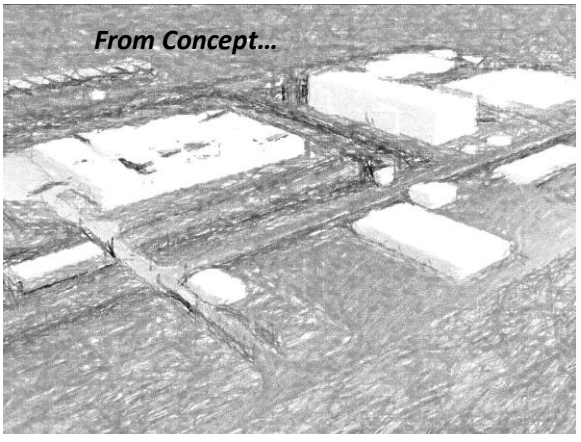
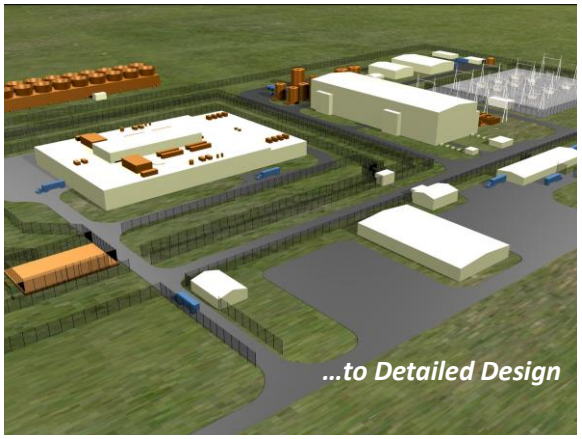
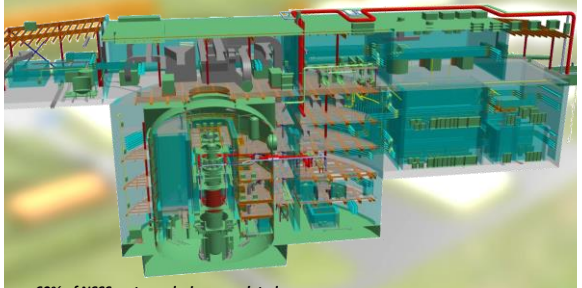




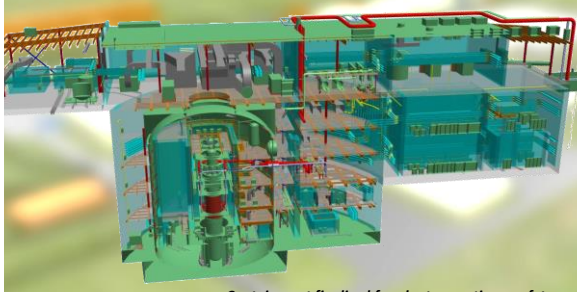
- Conceptual Design complete early 2012
- Established optimal power output (180 MWe)
- Defined “security-informed” plant layout
- Foundation for $<10^{-8}$ CDF safety goal
- Architecture for competitiveness (ONC and LCOE)

Nuclear Island



- *60% of NSSS systems design completed*
- *Energy storage supports 14-day self-sufficient passive cooling without offsite support*
- *Refueling systems and outage processes incorporated*
- *Seismic design established for 85% of North America*

Nuclear Island



- *Containment finalized for plant operations, safety*
- *High efficiency Reactor Service Building geometry*
- *Flooding issues addressed in design basis*
- *Aircraft Impact issue resolved with deep embedment*

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How Do We Get To Deployment

- Agreement on policy issues, regulatory framework
- Design/safety innovation
- Close attention to lessons learned

"If we can't take advantage of advances in safety, we will have failed…"

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Regulatory Framework

Pre-Application Engagement

- Monthly meetings, weekly interaction
- 20+ Topical and Technical Reports
- Technical approach to security, EPZ, etc.
- No regulatory changes required

10 CFR 52 Design-Specific Review Standard (DSRS)

- NRC Standard Review Plan (SRP) revision for SMRs
- Addresses lessons-learned from NP2010, risk/design information
- 42 of 167 DSRS sections already issued

10 CFR 50 Regulatory Framework Documents

- Defines content for Construction Permit Application
- Recognizes Clinch River first new CPA in decades
- Provides insight for Design Certification Application
- Creates structure for Operating License Application

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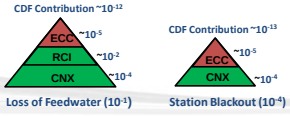
Design/Safety Innovation

- Diverse non-safety systems provide first defense beyond normal operations
- Elimination of sets of Design Basis Events via design features
- Simple, passive protection against low probability, beyond-design-basis events
- 14-day cooling internal to containment without offsite support
- 30-day spent fuel pool cooling
- Flood protection
- Other features protect reactor and containment for "non-credible" events
- Movement of events toward "non-credible"

ECC = Emergency Core Cooling System
RCI = Reactor Coolant Inventory & Purification
CNX = Auxiliary Condenser



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Lessons Learned

Review phase

- Pre-application engagement – *no surprises*
- Parallel reviews – *one design, one review*
- Risk-informed design
- Close attention to post-Fukushima environment
- Early escalation of issues

Contemporary construction projects

- ITAAC closure
- Changes during construction
- Level of detail in licensing documents

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"If we can't take advantage of advances in safety, we will have failed…"

"We" =

- ***Designers***
- ***Vendors/suppliers***
- ***Site owners/applicants***
- ***Constructors***
- ***Operators***
- ***Regulators***
- ***Inspectors***

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