JANUARY 20, 2011

ATTACHED ARE THE SLIDES FROM THE “B&W – CORE NUCLEAR DESIGN CODES AND METHODS QUALIFICATION” PRESENTATION, WHICH WAS GIVEN AT THE JANUARY 19, 2010 PUBLIC MEETING BETWEEN B&W AND THE NRC (MEETING NOTICE ML110060702)

THESE SLIDES WERE PROVIDED ON THE DATE OF THIS COVER SHEET.

B&W nuclear energy

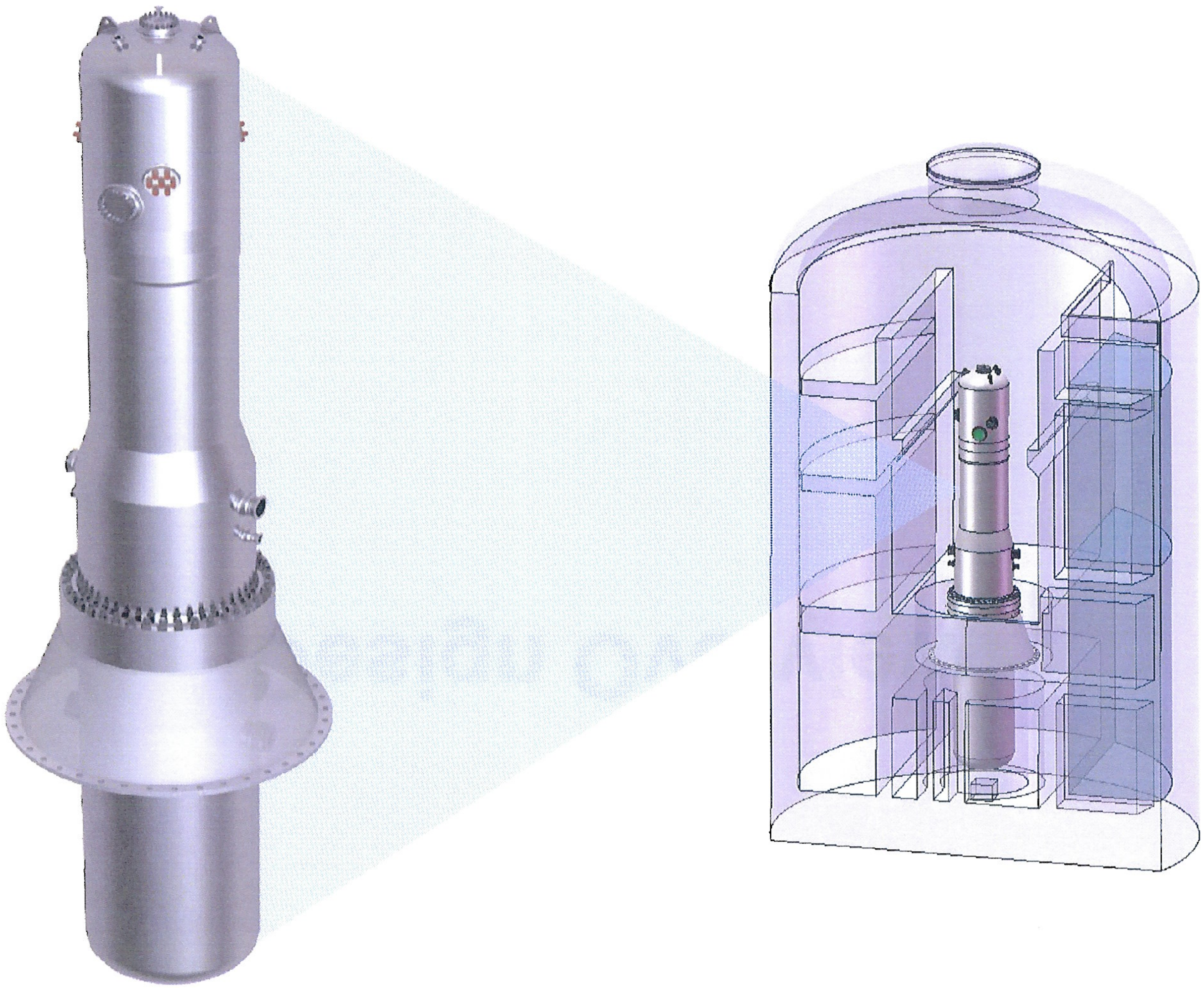
Meeting Between B&W NE and NRC Staff Core Nuclear Design Codes and Methods Qualification

January 19, 2011

AGENDA

- OBJECTIVES
- INTRODUCTIONS
- DESIGN OVERVIEW
- TOPICAL REPORT APPROACH & SCOPE
- STRATEGY FOR SCOPE EXPANSION
- CONCLUSIONS

Design Overview



Overview of the B&W mPower™ Reactor Design

High-Level Requirements

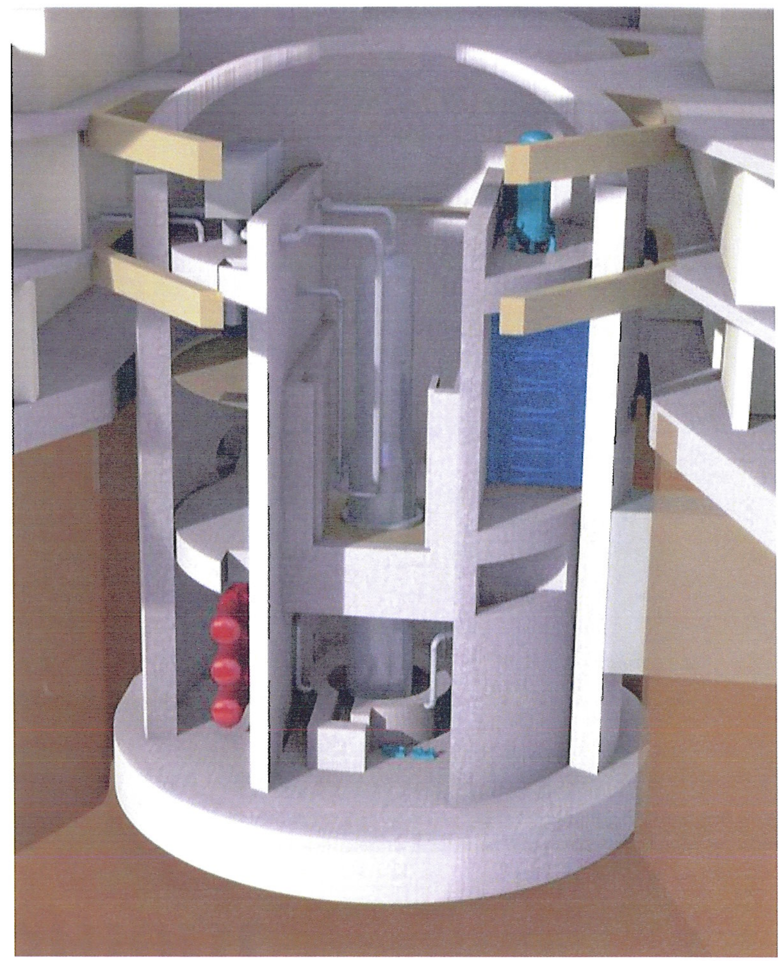
- 125 MWe plant net output per module & 60-year plant life
- NSSS forging diameter allows domestic forgings, unrestricted rail shipment
- Passive safety requirements – emergency (diesel) power is not required
  - Minimize primary coolant penetrations, maximize elevation of penetrations
  - Large reactor coolant inventory
  - Low core power density
- Standard fuel (less than 5% enriched U-235)
- Long fuel cycle, 4+ year core life

High-Level Requirements-Cont.

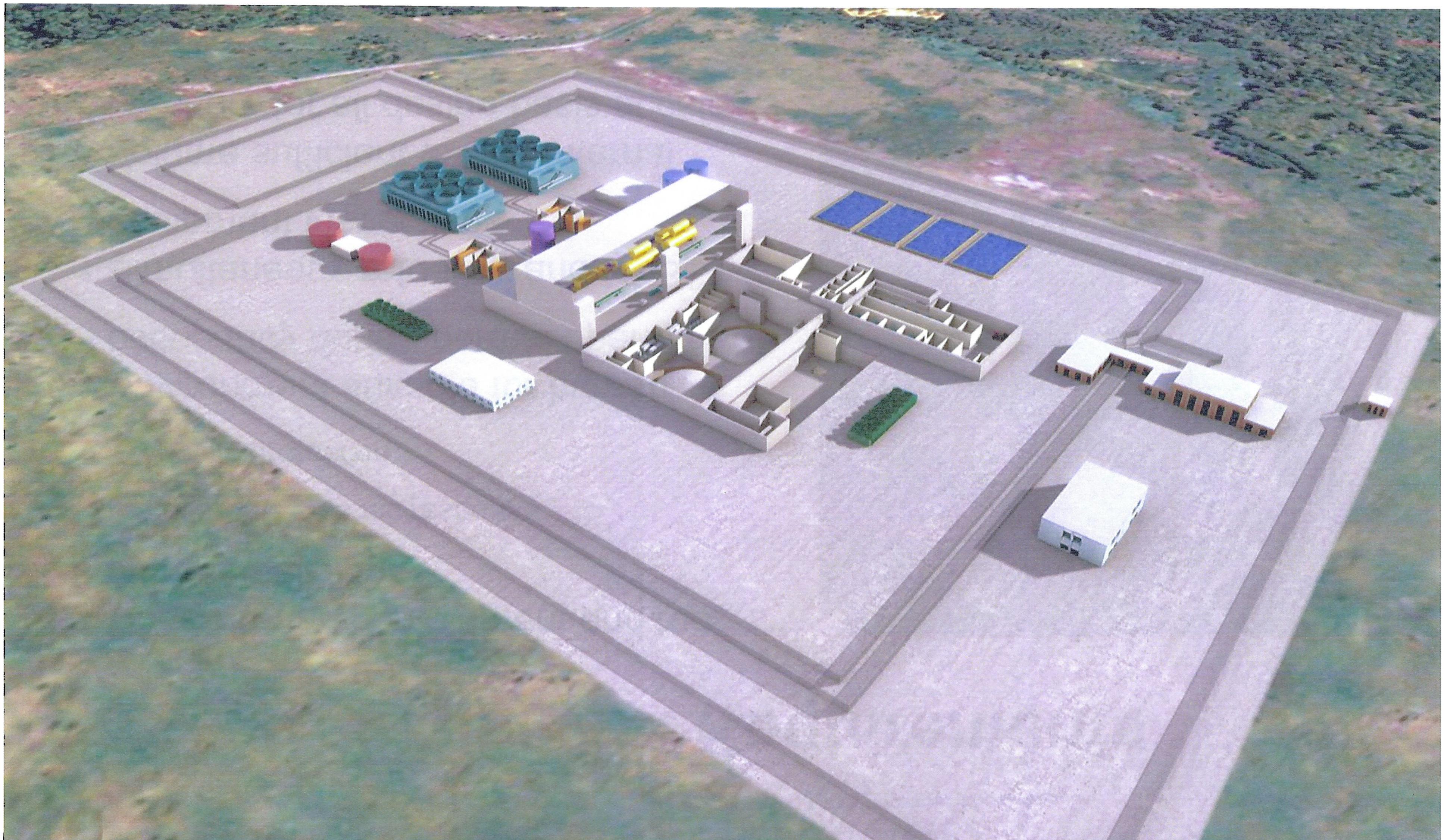
- Spent fuel storage on site for life of plant
- No soluble boron in primary system for normal reactivity control
- Conventional / off-the-shelf balance of plant systems and components
- Accommodate air-cooled condensers (Baseline) as well as water-cooled condensers
- Flexible grid interface (50 Hz or 60Hz)
- Digital instrumentation and controls compliant with NRC regulations

Containment Requirements

- Underground containment and fuel storage buildings
  - Favorable seismic response
  - Missile protection
- Environment suitable for human occupancy during normal operation
- Simultaneous refueling and NSSS equipment inspections
- Volume sufficient to limit internal pressure for all design basis accidents



Site Development



Technology Overview

Integral Nuclear Steam Supply System

- Integrates core, steam generator, and pressurizer into a single vessel
- Control rod drive mechanisms (CRDMs) and primary coolant pumps inside vessel
- Reactor coolant pressure boundary penetration size and location minimize coolant loss during LOCA – core remains covered throughout the design basis LOCA
- Housed within a steel lined, reinforced concrete, dry containment

Integral design reduces overall plant complexity and enhances safety

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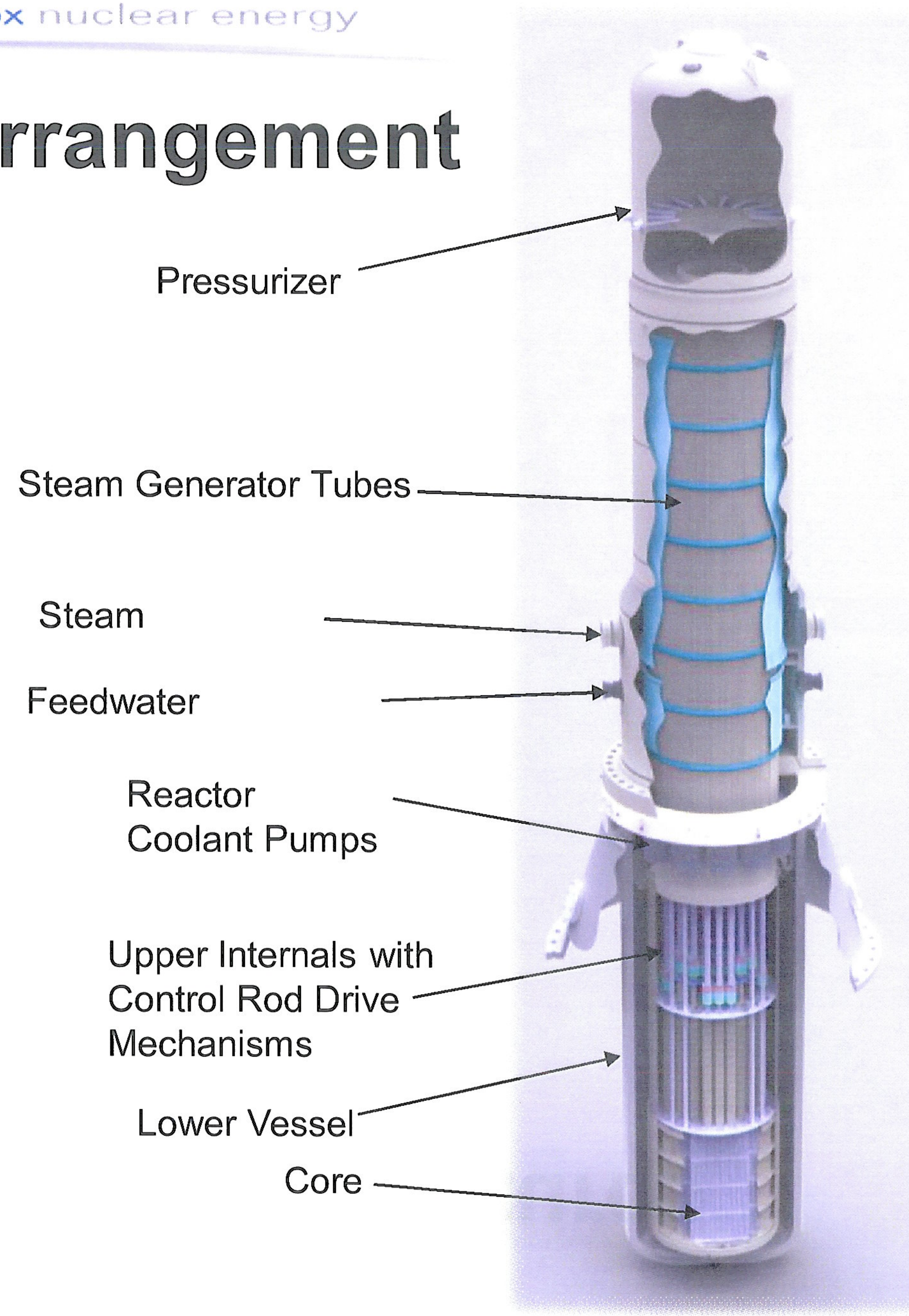
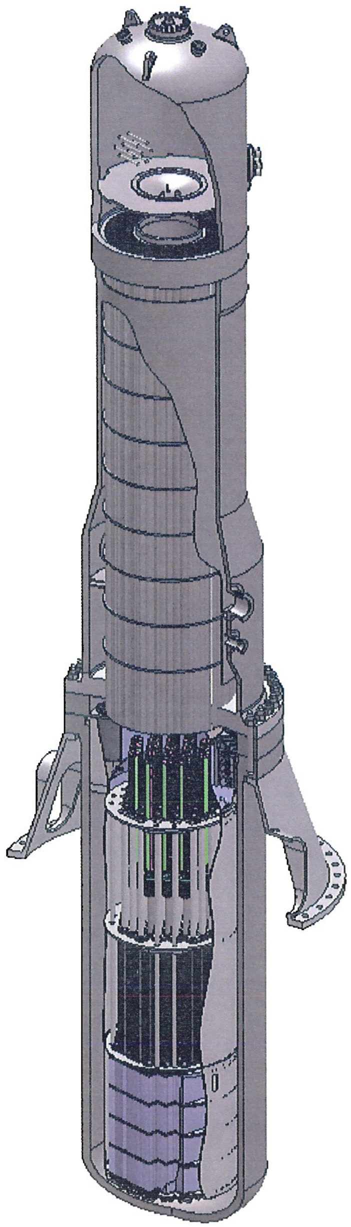
Overall Reactor Arrangement



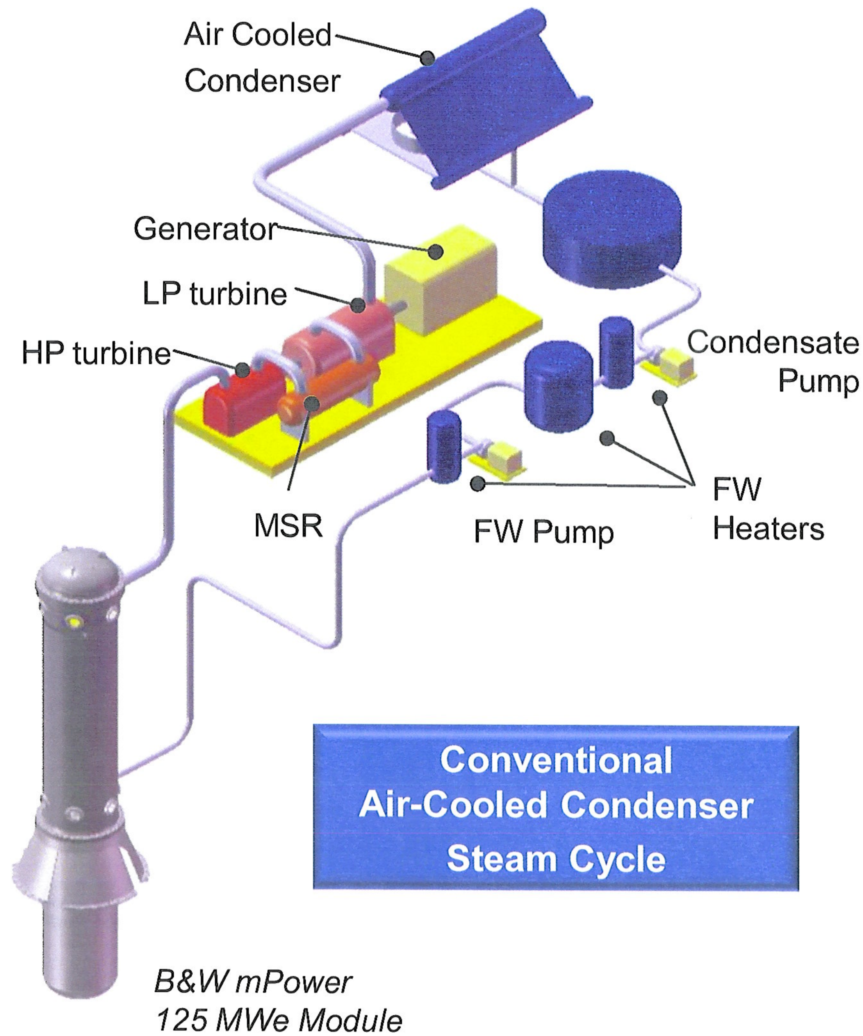


Inherent Safety Features

- Large reactor coolant volume
  - Large RCS volume
  - More coolant to protect the core
- Small penetrations at high elevation
  - High penetration locations
  - Small penetrations

Balance of Plant Design

- Plant designed to produce a nominal 125 MWe
  - Air-cooled condenser (Baseline)
  - Water-cooled condenser
- Conventional steam cycle equipment (small, easy to maintain and replace)
- BOP operation not credited for design basis accidents
  - All fuel can be cooled for a minimum of 72 hours without any BOP system



Instrumentation and Controls

- State of the art digital system
- Provides monitoring, control, and protection functions
- Separate safety and non-safety systems
- Implement lessons learned from current licensing activities
- Northrop Grumman under contract to develop I&C architecture

Summary

- NSSS utilizes an integral PWR design
  - Uses a single integral economizer once through steam generator to produce superheated steam
  - Internal reactor coolant pumps and control rod drive mechanisms
  - Internal pressurizer
- Passive safety systems, inherent NSSS safety features
- Long operating cycle
- Underground containment
- Spent fuel storage on site for life of plant
- Reactor plants for multiple module designs

Topical Report Approach and Scope

- Purpose of Report
- Choice of Cases
- TMI Cycle Data and Critical Experiments
- Results of Analysis
- Demonstrate the code usage capability
- Confidence in that the code can produce accurate results

Strategy for Path Forward

- MCNP Code Use and Recognition
- Planned use of MCNP for mPower Design
- Expected Release of MCNPX Version 2.70
- CASMO/SIMULATE Documentation
- Comparison of MCNP versus CASMO/SIMULATE for Reference mPower Design

Next Actions

- Tentative Schedule –Supplemental Submittal

- Periodic Meetings/Conference Calls

Conclusions