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Safety Analysis Preliminary Results

(Redacted Version)

January 29, 2013

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Agenda

Objectives

Accident Analysis Status Update

Model Overview
- Primary System
- Secondary System
- Emergency Core Cooling System (ECC)

Preliminary Accident Analysis Results
- Accident Description
- Inputs and Modeling Assumptions
- Special Modeling
- Preliminary Results

Conclusions and Future Actions

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Objectives

Discuss Plant Responses to Design Basis Events

- Introduction to B&W mPower™ reactor accident response
- Focus on Ch. 15 RELAP5 results

Provide Model Overview

- Overview of RELAP5 model and analysis approach

Consider Future Interactions

- Identify areas for further discussion
- Containment (Ch. 6), Severe Accidents (Ch. 19), etc.

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Accident Analysis Status Update

Preliminary Chapter 15 Analysis

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Design Transients

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Methods Development

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Code Qualification

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[CCI per Affidavit 4(a)-(d)]

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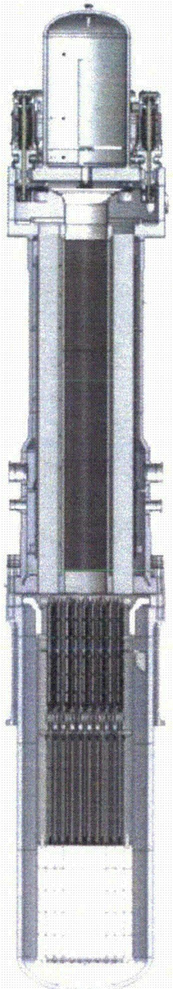
Primary System Model



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[CCI per Affidavit 4(a)-(d)]

Primary System Model (cont.)

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Secondary System Model

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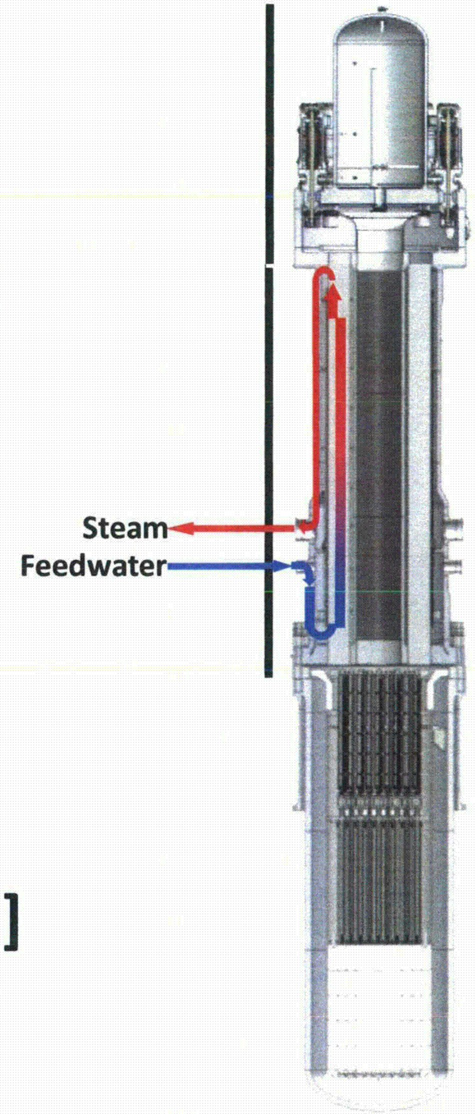

[CCI per Affidavit 4(a)-(d)]

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ECC Flow Diagram

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[CCI per Affidavit 4(a)-(d)]

ECC Model

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Nuclear Island Systems Core Cooling Strategy

- Reactor Coolant System (RCS) design minimizes both the probability and impact of design basis accidents
- CNX and RCI maintain RCS within safe operating envelope as first line of defense (defense-in-depth)
- A simple, passive safety system protects the reactor core in the event that conditions in RCS leave safe operating envelope

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- Core remains covered for all design basis transients and postulated accidents

[CCI per Affidavit 4(a)-(d)]

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Robust Defense-in-Depth Strategy

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Robust Defense-in-Depth Strategy

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Loss-Of-Coolant-Accident (LOCA) Inputs and Modeling Assumptions

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LOCA Inputs and Modeling Assumptions (cont.)

Modeling Assumptions and Conservatisms

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LOCA Inputs and Modeling Assumptions (cont.)

Trip Setpoints

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ECC Setpoints

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[CCI per Affidavit 4(a)-(d)]

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LOCA Special Modeling

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 [CCI per Affidavit 4(a)-(d)]

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LOCA Description

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[CCI per Affidavit 4(a)-(d)]

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[LOCA Preliminary Results

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[CCI per Affidavit 4(a)-(d)]

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LOCA Preliminary Results (cont.)

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[CCI per Affidavit 4(a)-(d)]

LOCA Preliminary Results (cont.)

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[CCI per Affidavit 4(a)-(d)]

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LOCA Preliminary Results (cont.)

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[CCI per Affidavit 4(a)-(d)]

Loss of Feedwater (LOFW) Inputs and Modeling Assumptions

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LOFW Inputs and Modeling Assumptions (cont.)

Modeling Assumptions and Conservatisms

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[CCI per Affidavit 4(a)-(d)]

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LOFW Inputs and Modeling Assumptions (cont.)

Trip Setpoints

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ECC Setpoints

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LOFW Special Modeling

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[CCI per Affidavit 4(a)-(d)]

LOFW Accident Description

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[CCI per Affidavit 4(a)-(d)]

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LOFW Preliminary Results

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[CCI per Affidavit 4(a)-(d)]

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LOFW Preliminary Results (cont.)

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[CCI per Affidavit 4(a)-(d)]

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LOFW Preliminary Results (cont.)

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[CCI per Affidavit 4(a)-(d)]

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LOFW Preliminary Results (cont.)

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Complete Loss of Forced Coolant (LOFC) Inputs and Modeling Assumptions

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LOFC Inputs and Modeling Assumptions (cont.)

Modeling Assumptions and Conservatisms

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[CCI per Affidavit 4(a)-(d)]

LOFC Inputs and Modeling Assumptions (cont.)

Trip Setpoints

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LOFC Special Modeling

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[CCI per Affidavit 4(a)-(d)]

Complete Loss of Forced Coolant Description

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LOFC Preliminary Results

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LOFC Preliminary Results (cont.)

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[CCI per Affidavit 4(a)-(d)]

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LOFC Preliminary Results (cont.)

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Conclusions and Future Actions

Chapter 15 Preliminary Results

- Preliminary analysis has been effective in designing the plant for safety
- Core remains covered for design basis LOCA, LOFW, and LOFC

Path Forward

- Continue to advance Methods Development
- Complete transition to RELAP5-3D
- Complete Nodalization Optimization

Future Interactions

- Areas for further discussion based on today's feedback
- Containment (Ch. 6), Severe Accidents (Ch. 19), etc.