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B&W mPower Core and Fuel Design Redacted

March 22, 2012

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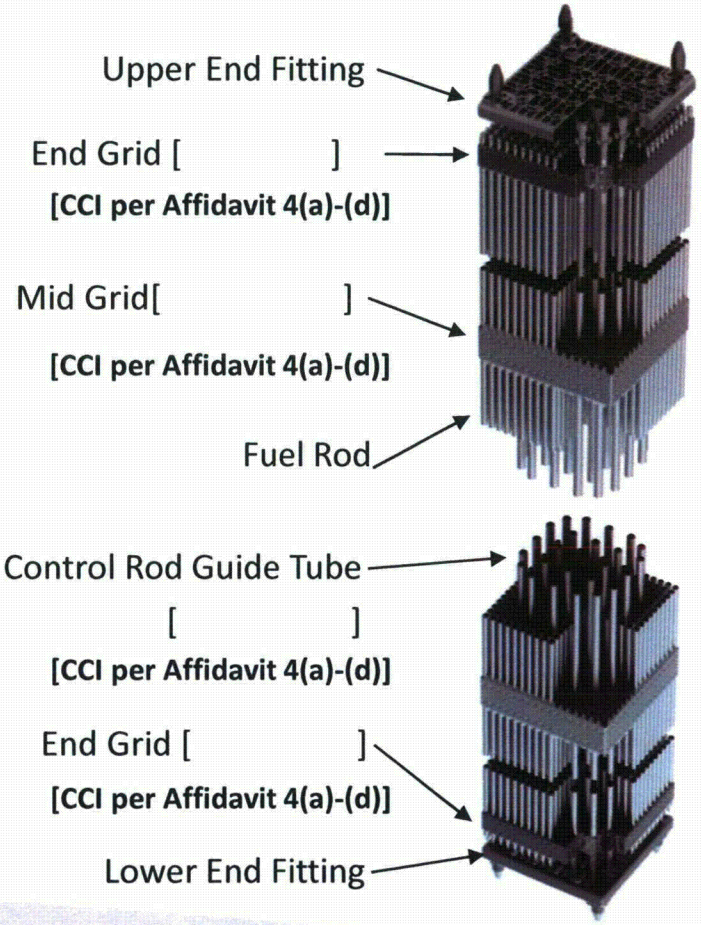
Fuel Assembly Design



Fuel Assembly Attributes

- 17 x 17 Fuel Rod Array
- [
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-] [CCI per Affidavit 4(a)-(d)]

Shortened and Simplified Conventional Fuel Assembly Design

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Fuel Rod Design

Fuel Rod Attributes

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-] [CCI per Affidavit 4(a)-(d)]
- **Low Power Density**
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] [CCI per Affidavit 4(a)-(d)]

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

Conventional Fuel Rod Design

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Assembly Lattice Layout

- Fuel assembly conceptually similar to [a conventional 17x17 square lattice PWR, with the exception that is shorter

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

Guide tube (GT) layout in the mPower fuel lattice]

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

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Lattice Layout Example

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

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Reference Core Design parameters

Core Data	
Total number of assemblies	[
Estimated core loading	] [CCI per Affidavit 4(a)-(d)]
Rated thermal power level	530 MWt
Rated thermal power density	[ ] [CCI per Affidavit 4(a)-(d)]
Rated core flow	30.0 Mlb/hr
Bypass flow	[ ] [CCI per Affidavit 4(a)-(d)]
Reference dome pressure	2050.0 psia
Reference reactor mid-plane pressure	[
Reference inlet temperature	] [CCI per Affidavit 4(a)-(d)]
Reference outlet temperature	608 °F
Subcooling (outlet)	[ ] [CCI per Affidavit 4(a)-(d)]
[ ] [CCI per Affidavit 4(a)-(d)]	

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Reference Core Design Parameters

Energy Parameters	
Cycle length	**48 months**
Cycle capacity factor	**[**
Cycle energy (estimated)	
EOC Power Level	
Cycle hot target k-effective	
Cycle cold target k-effective	**] [CCI per Affidavit 4(a)-(d)]**
Margin Parameters	
Minimum cold shutdown margin	**[**
Maximum nodal peaking	**] [CCI per Affidavit 4(a)-(d)]**
Control Parameters	
Exposure between sequence exchanges	**[**
Control rod utilization	
Parked control rod positions preferred	**] [CCI per Affidavit 4(a)-(d)]**

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Core Loading – Fuel Assembly Types

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

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Core Loading – Assembly Map

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

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Cycle Management

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Cycle Management (cont.)

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Cycle Management (cont.)

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

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Nodal Peaking

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

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Core Axial Offset

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

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Cold Shutdown Margin

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

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EOFP Axial Power and Exposure Profile

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

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EOC Radial Exposure Distribution

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

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Lattice Studies – MCNPX vs. CASMO-5

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

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Radial Reflector Thermal Flux Profile

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

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Radial Reflector Total Flux Profile

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

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Core Thermal-Hydraulic Subchannel Analysis

- VIPRE-01 mod 2.4f95 is used to model the core thermal-hydraulics
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- s] [CCI per Affidavit 4(a)-(d)]

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Cycle Plot - MDNBR

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

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Cycle Plot – Peak Centerline Fuel Temperature

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

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Axial Plot- Centerline Fuel Temperature

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

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Critical Heat Flux Testing

- Testing is being conducted at Stern Laboratories in Hamilton, Ontario, Canada
- Two test series have been completed
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[CCI per Affidavit 4(a)-(d)]

- Three additional tests are planned in 2012 (Tentative plan)
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[CCI per Affidavit 4(a)-(d)]

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CHF Test Bundle

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Unit cell test bundle before insertion into the flow channel

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

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Example of Test Results

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

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Critical Heat Flux Correlation Development

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

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Fuel Design Status

- Preliminary Mechanical Design and Testing
- Reference Static Core Design - Cycle
- CHF Testing and Correlation Development
- Methods to be Submitted in Topical Reports
- Best Estimate Transient Analyses
- Method of Operations