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Reactor Pressure Vessel (RPV) Internals

September 17, 2013
(Redacted Version)

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Purpose/Objective

- Overview of the mPower™ reactor design
- Definition of the Reactor Pressure Vessel (RPV) internals
- ASME Code classification of RPV internals
- Achieve alignment of terminology between mPower and NRC

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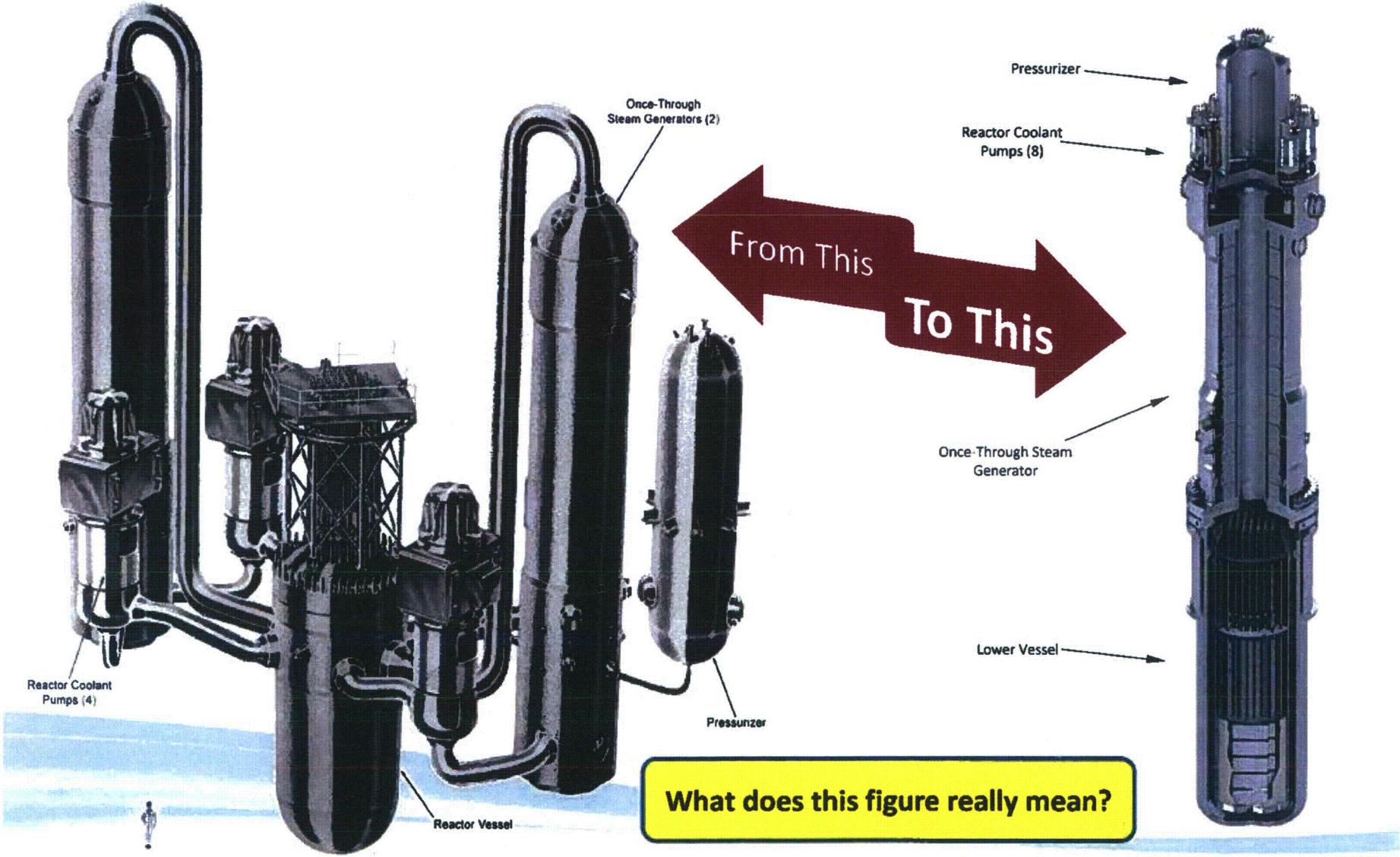
Integral Reactor Definition



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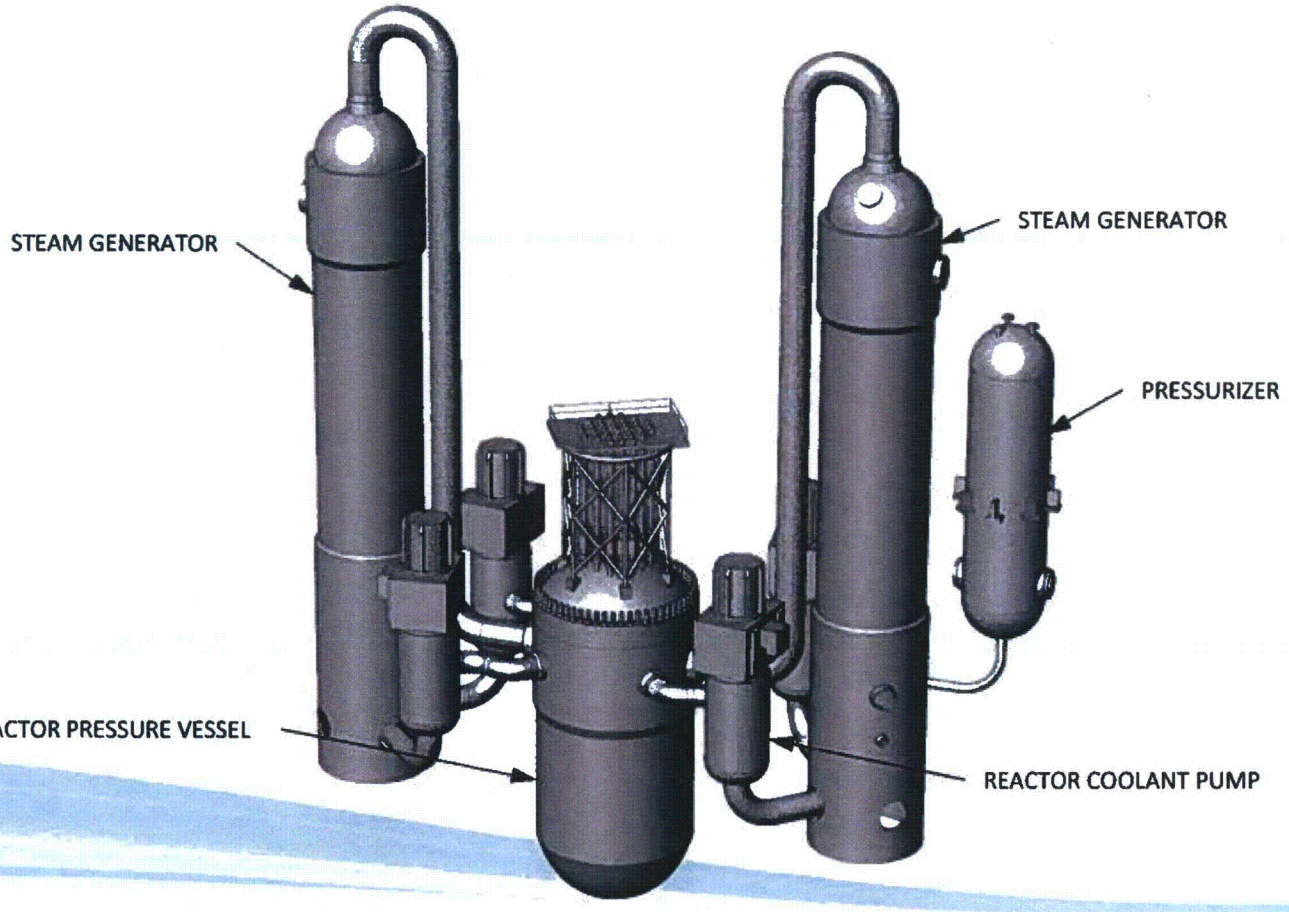
Integral Reactor Definition

Traditional Reactor



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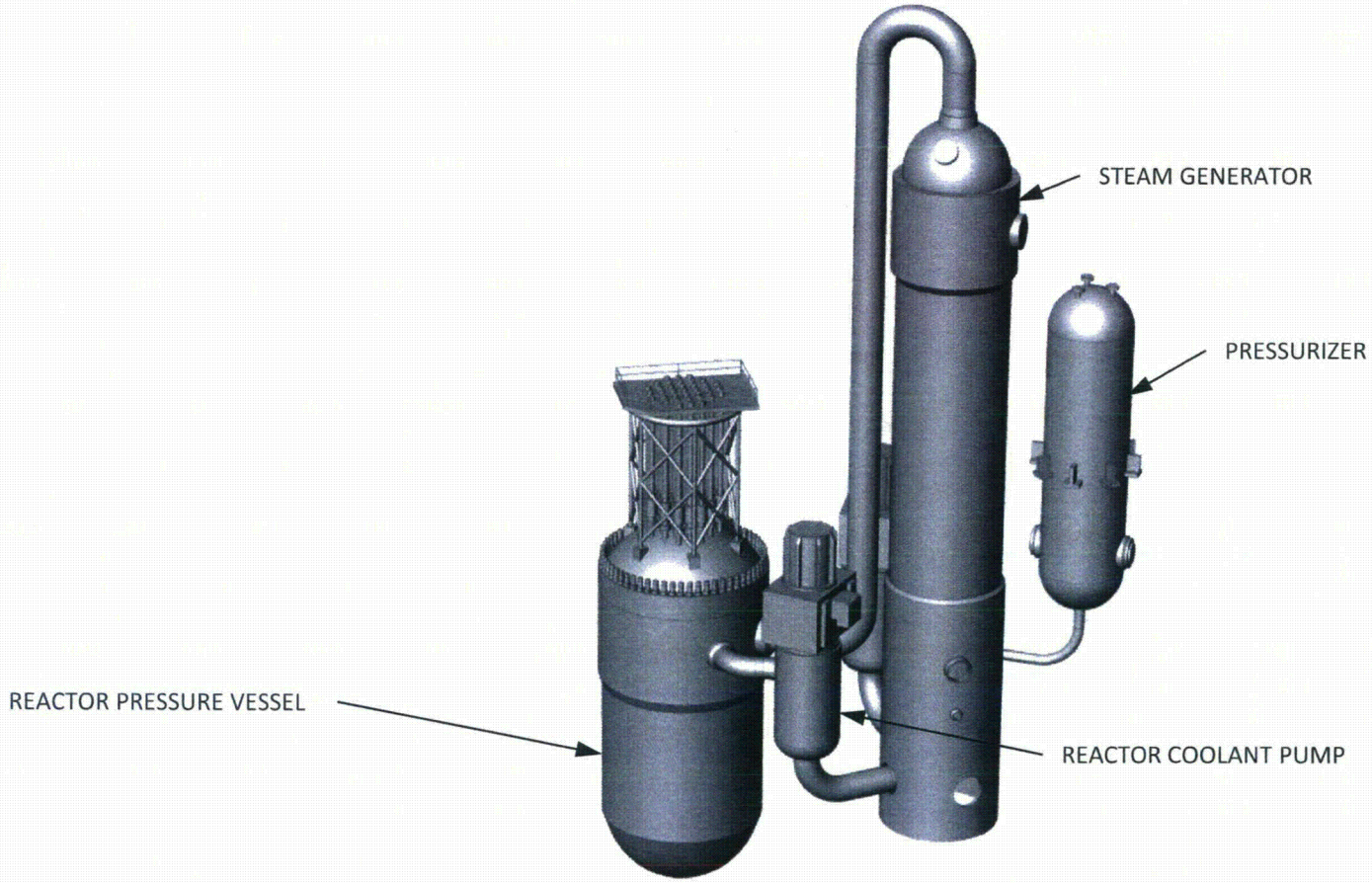
Integral Reactor Definition

Reactor Evolution

- Single loop



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Integral Reactor Definition

Reactor Evolution

- Single loop
- No loop piping

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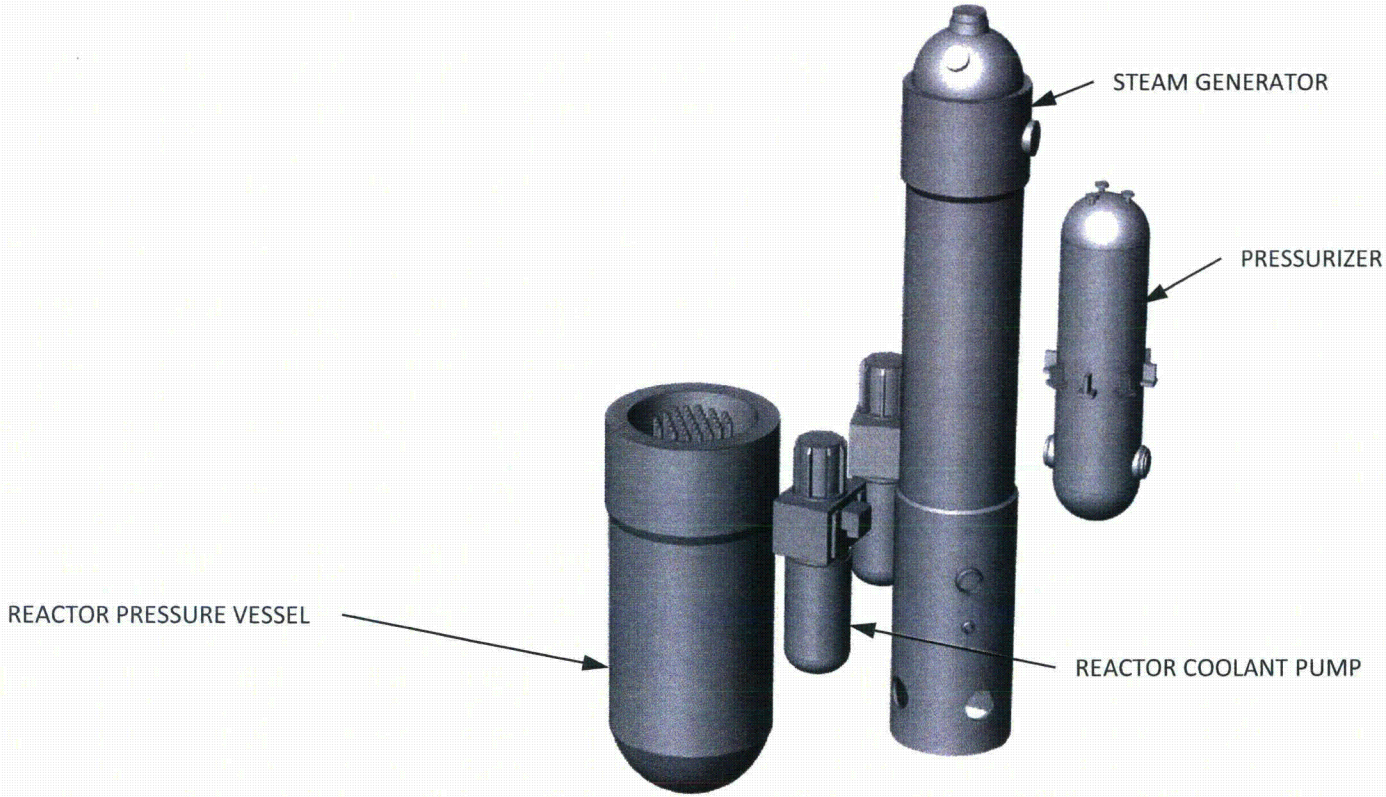
Integral Reactor Definition

Reactor Evolution

- Single loop
- No loop piping
- Internal CRDMs



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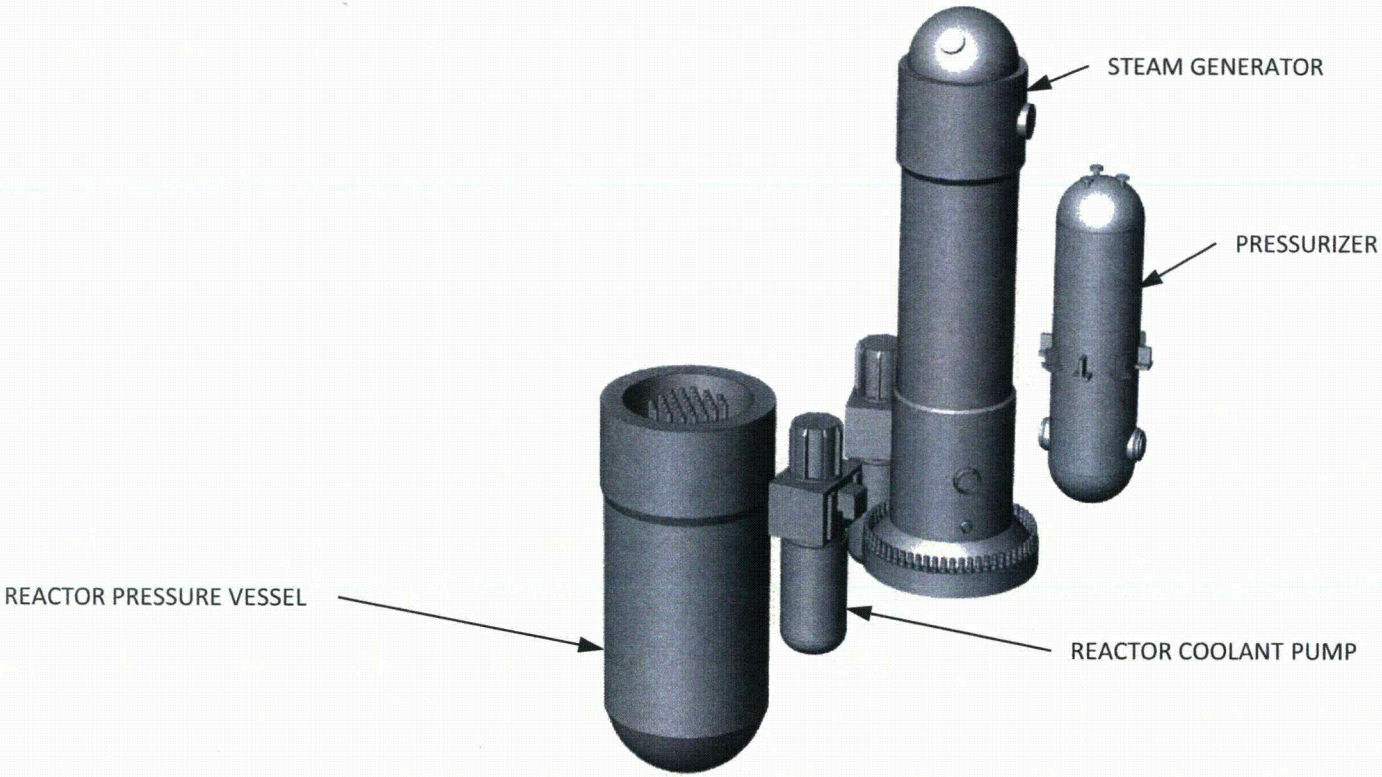
Integral Reactor Definition

Reactor Evolution

- Single loop
- No loop piping
- Internal CRDMs
- Integral SG



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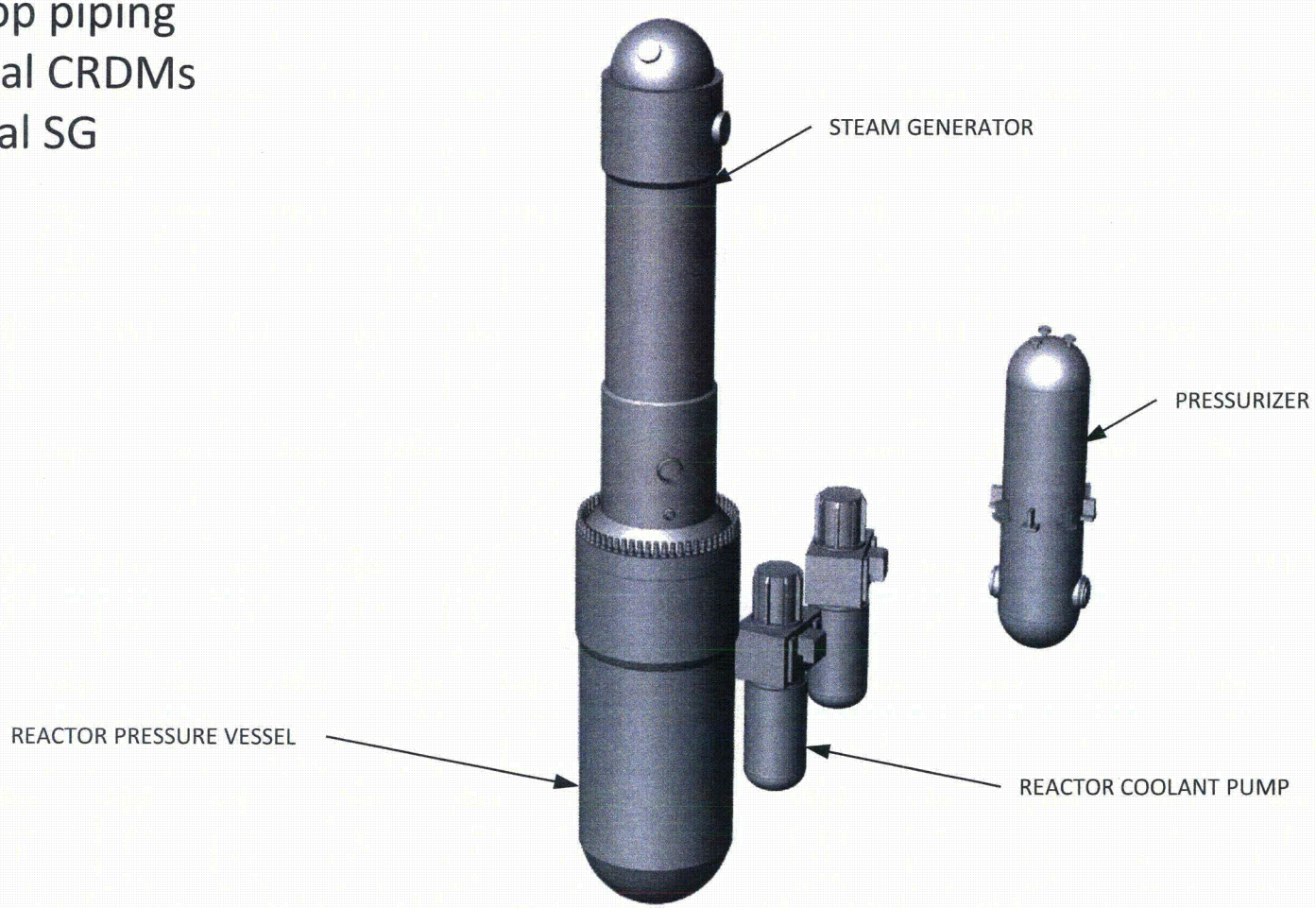
Integral Reactor Definition

Reactor Evolution

- Single loop
- No loop piping
- Internal CRDMs
- Integral SG



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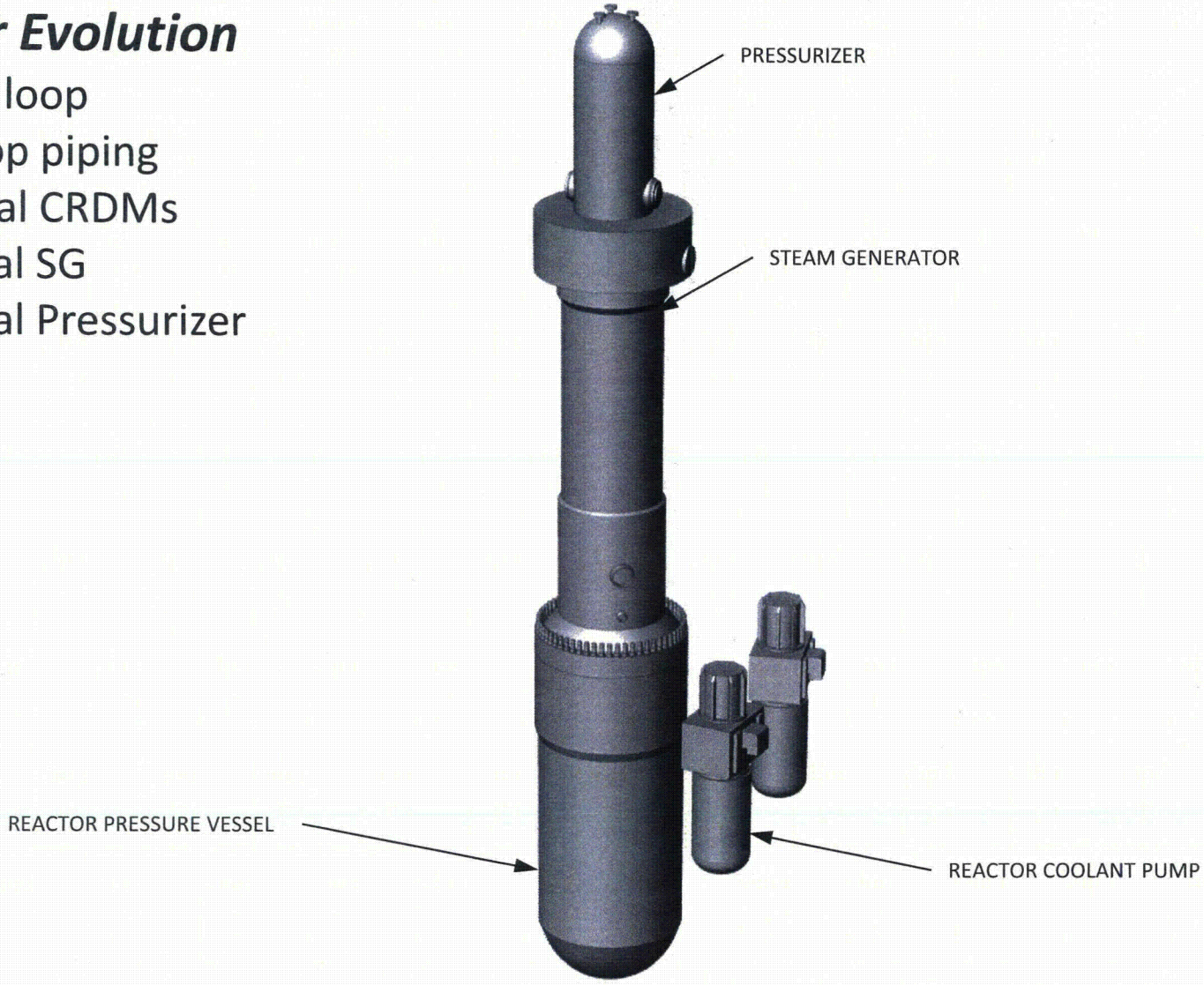
Integral Reactor Definition

Reactor Evolution

- Single loop
- No loop piping
- Internal CRDMs
- Integral SG
- Integral Pressurizer



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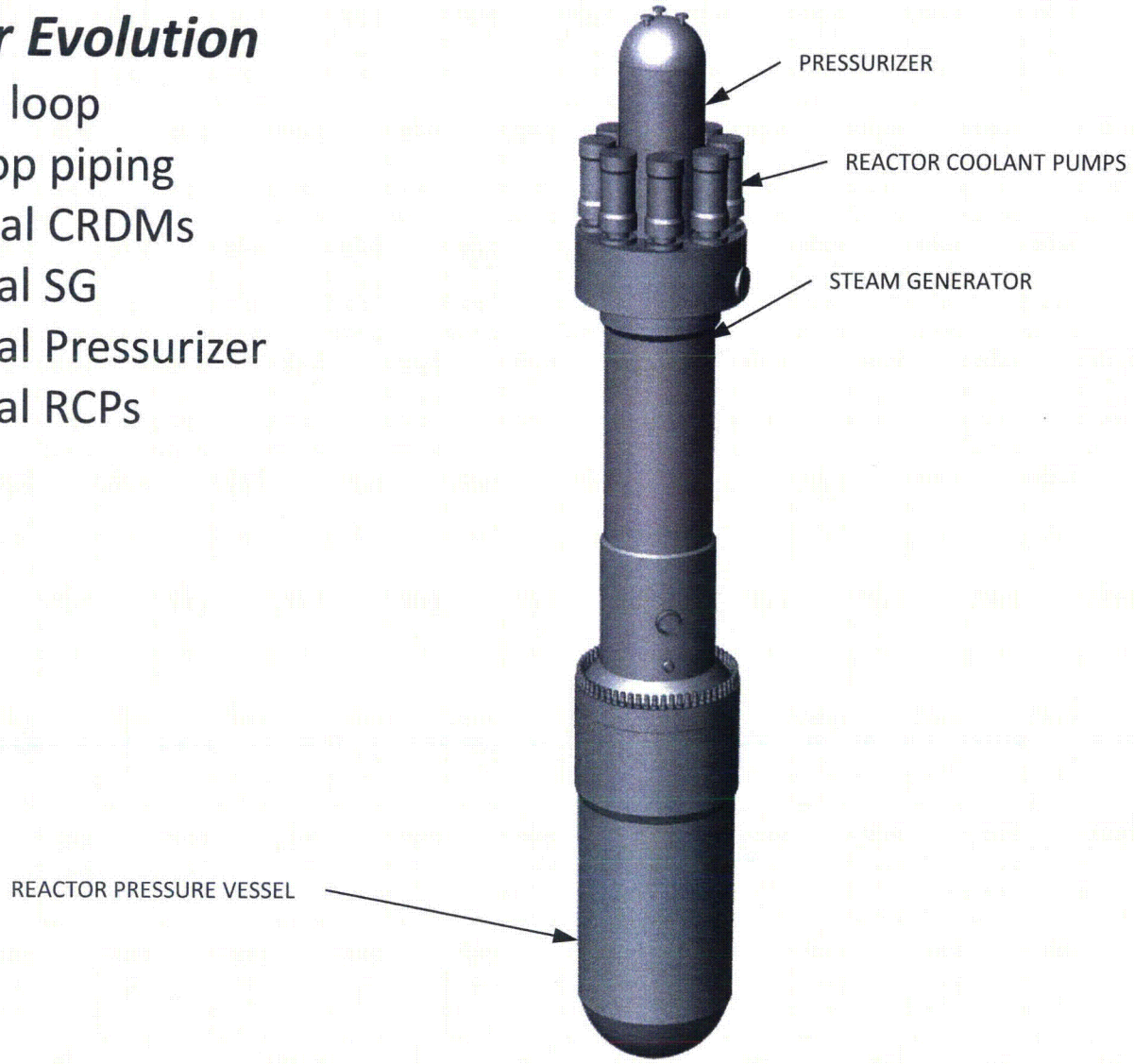
Integral Reactor Definition

Reactor Evolution

- Single loop
- No loop piping
- Internal CRDMs
- Integral SG
- Integral Pressurizer
- Integral RCPs



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Integral Reactor Definition

B&W mPower Reactor [

- Single loop
- No loop piping
- Internal CRDMs
- Integral SG
- Integral Pressurizer
- Integral RCPs
- Integral Isolation Valves

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Overview of the mPower Reactor

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[Proprietary per Affidavit 4(a)-(f)]

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Reactor Component Breakdown

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B&W mPower REFERS TO THE OVERALL ASSEMBLY OF THESE COMPONENTS AS THE REACTOR

 [Proprietary per Affidavit 4(a)-(f)]

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RPV Lower Internals (Core Support Structure)

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RPV Upper Internals

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Pressure Boundary

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Definition of RPV Internals

- Consistent with SRP 3.9.5, the term "reactor internals" includes core support and other internal structures and refers to all structural and mechanical elements inside the RPV
  - For the mPower reactor, the RPV is the lower vessel
  - Does not include:
    - The upper vessel (including the steam generator, riser, pressurizer, and RCPs), which will be addressed in DCD Section 5.4
    - Reactor fuel elements which will be addressed in DCD Chapter 4
    - Control rod drive elements which will be addressed in DCD Section 3.9.4

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ASME Code Classification of Reactor Internals

Component	Classification[1]
[	]

Notes:
1. CS – Core Support Structure
   IS – Internal Structure
   NB – Class 1 Pressure Boundary

[Proprietary per Affidavit 4(a)-(f)]

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Conclusions

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- For the mPower reactor, the RPV is the lower vessel
- Comments provided on DSRS 3.9.5 consistent with the mPower design