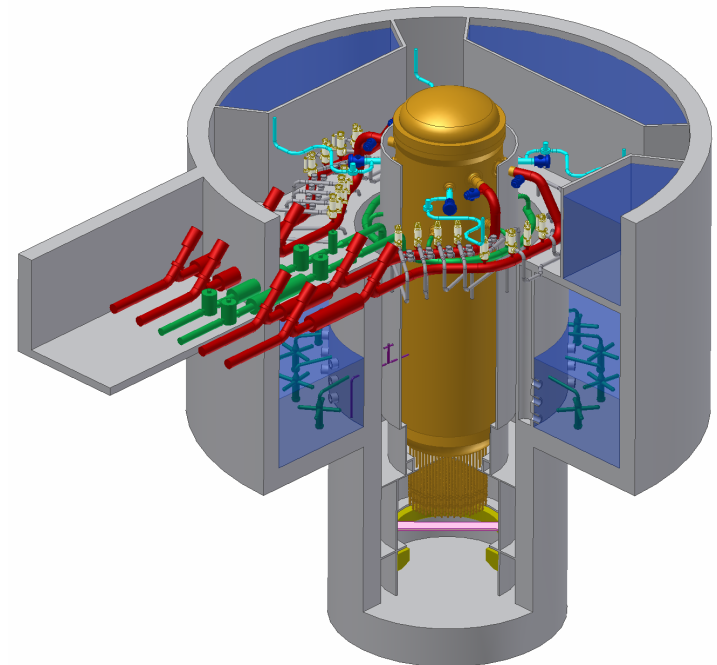


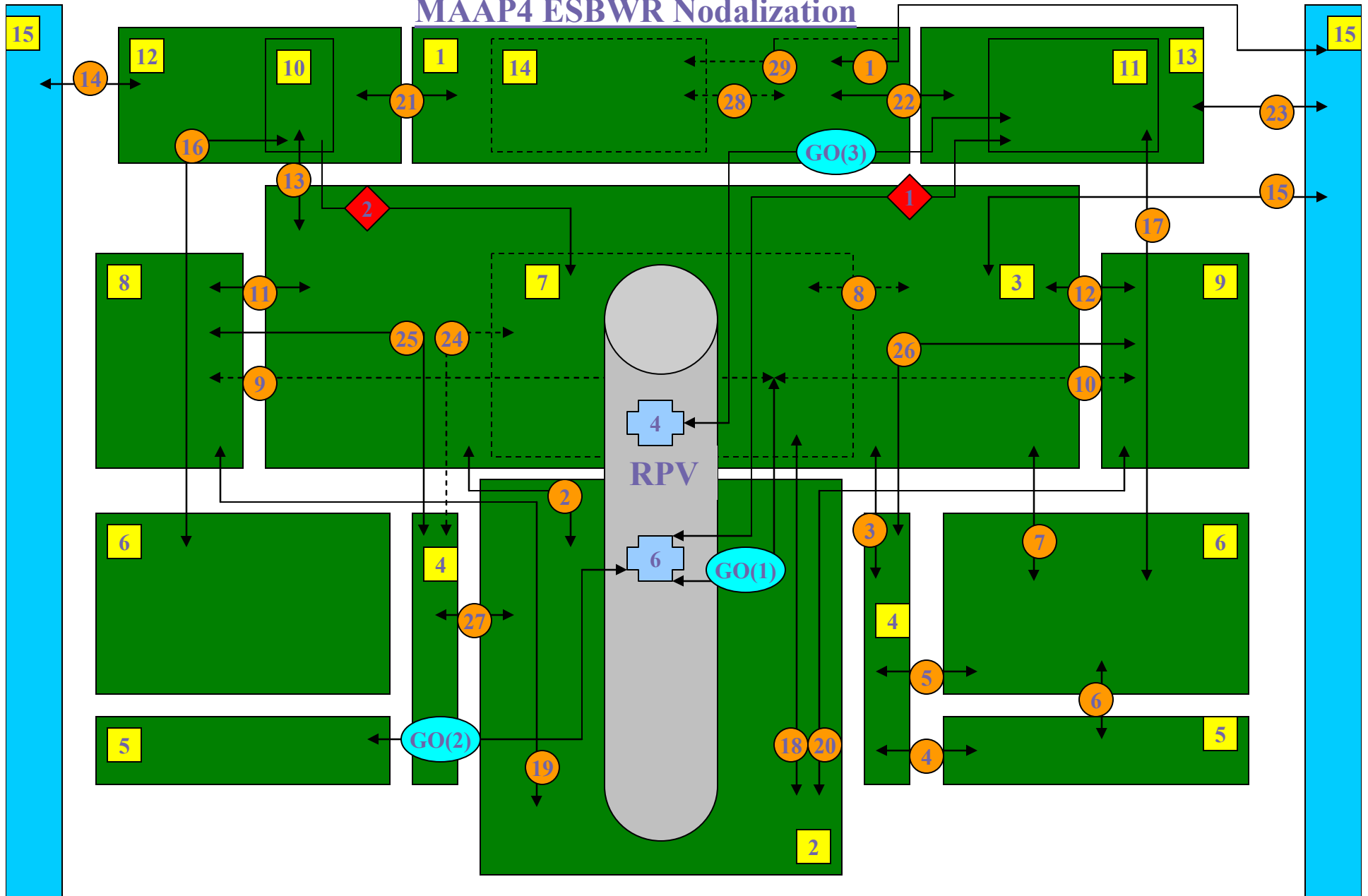
# GE MAAAP Model for Level 2 PRA

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March 8, 2006



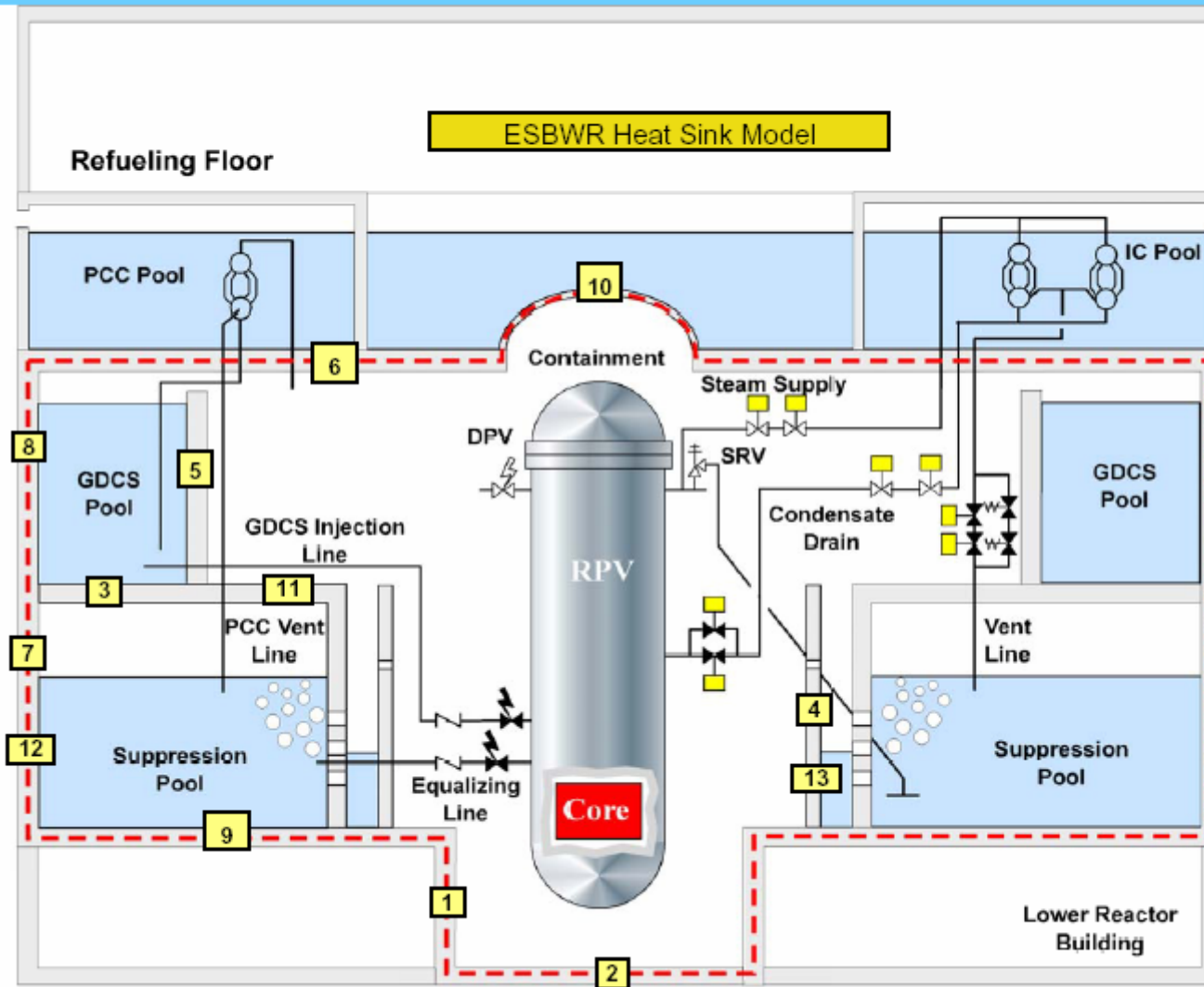
# MAAP4 ESBWR Nodalization



## Containment Node Definitions

- 1: Outer pools feeding PCCS pools and ICS pools
- 2: Lower and middle drywell
- 3: Upper drywell
- 4: Drywell downcomer to suppression pool
- 5: Lower suppression pool serving the lower and middle downcomer vents
- 6: Upper suppression pool serving the upper downcomer vent and wetwell freeboard
- 7: Gravity-driven cooling system (GDCS) pool 1
- 8: Gravity-driven cooling system (GDCS) pool 2
- 9: Gravity-driven cooling system (GDCS) pool 3
- 10: Passive containment cooling system (PCCS) heat exchangers
- 11: Isolation condenser system (ICS) heat exchangers
- 12: Passive containment cooling system (PCCS) pools
- 13: Isolation condenser system (ICS) pools
- 14: Isolated refueling water storage pool above drywell closure head
- 15: Environment

## ESBWR Heat Sink Model





# ESBWR MAAP Core Model

13 Axial Nodes

- > 10 fuel, 3 other

5 Radial Nodes

End of Life, Equilibrium Core

Chimney Model

- > Mass in top guide

- > Volume in shroud head

# Steady State Comparison

	<u>Design</u>	<u>MAAP</u>
Water in Vessel 3.63e+5	(kg) 3.71e+5	
Steam Flow (kg/hr)	8.76e+6	8.79e+6
Feed Flow (kg/hr)	8.74e+6	8.79e+6
Pressure (MPa)	7.17	7.19

Good Agreement for These Parameters

# Accident Scenario T\_DP\_nIN

Short or long-term coolant injection to RPV not available

ADS is assumed to be actuated if downcomer water level drops below 11 m.

Heat removal by ICs not credited.

PCC & PCC/IC pool makeup available

GDCS deluge system is also available for injection onto the lower drywell floor.

# Key Timing / Values

## Depressurization

SRV	0.0086 hr	DPV	0.036 hr
Core Uncovered			0.34 hr
Core Exceeds 2500 F			
Hot Node	0.95 hr	Average	1.82 hr
Start of Core Relocation			1.84 hr
RPV Failure			6.3 hr
Drywell Pressure			5.7 MPa
Decay Heat @ 24 hr			2.48e+7 W
PCCS Heat Removal @ 24 hr			2.15e+7 W
Csl Fraction Released			7.9e-5