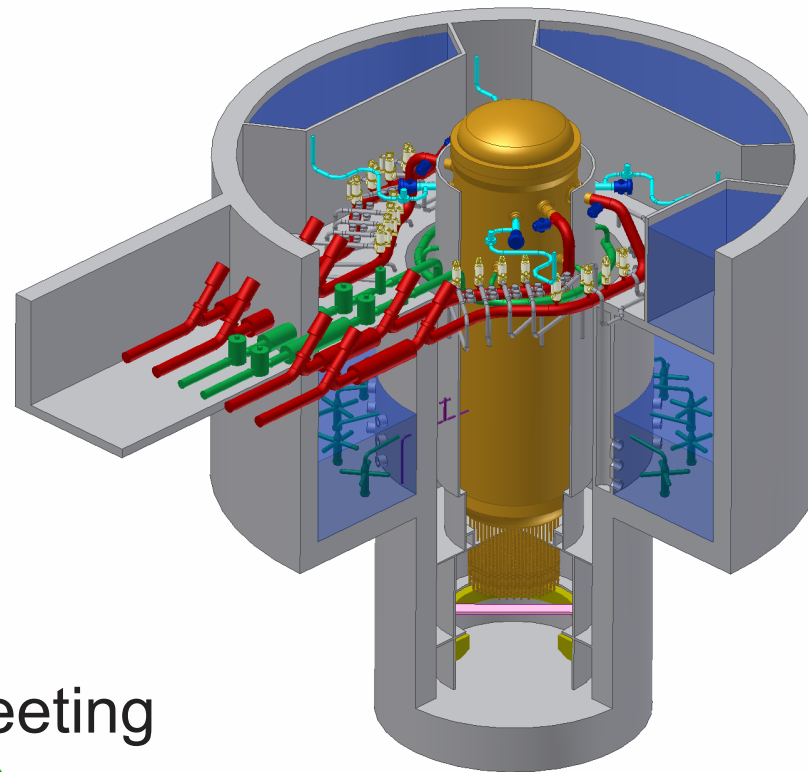


# Containment Isolation



ESBWR Pre-application Meeting  
October 12 and 13, 2004 

# Containment Isolation

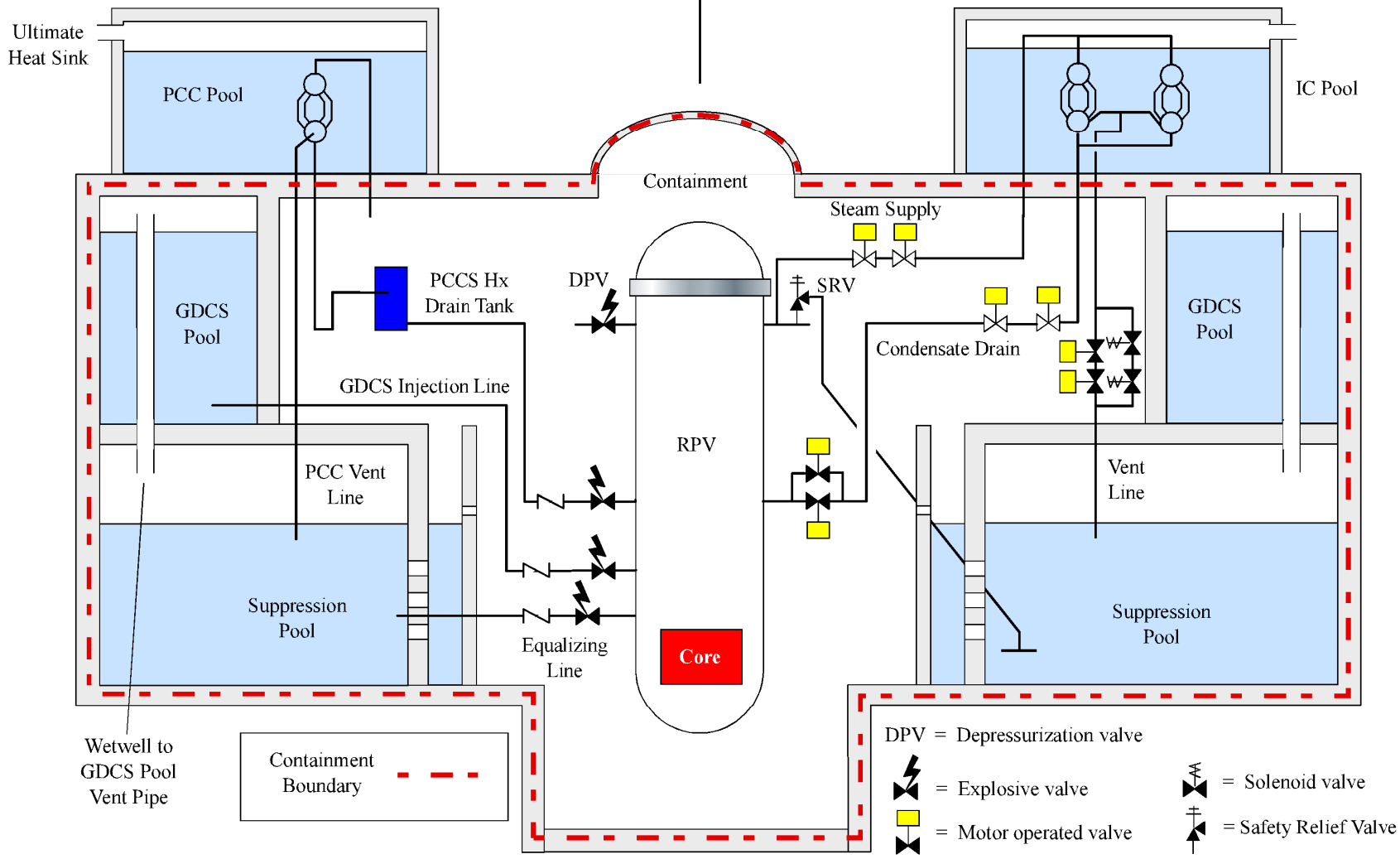
- The ESBWR will comply with the applicable containment isolation requirements as described in General Design Criteria (GDC) 54, 55, 56 and 57 for all systems except two (2)
- For most systems the containment isolation capabilities will be identical or similar to the ABWR
  - > Main Steam, Feedwater, Reactor Water Cleanup
- Two Exceptions
  - > Isolation Condenser (IC) System
  - > Passive Containment Cooling (PCC) System

# Containment Isolation (cont)

- First exception is for the Isolation Condenser (IC)
  - > System is part of the reactor coolant pressure boundary (RCPB)
  - > Applicable regulation is GDC 55
  - > System design includes two automatic containment isolation valves (CIVs) in series for both steam outlet and condensate return
  - > All CIVs are normally open
    - System is maintained in hot standby

**Passive Containment Cooling System (PCCS)  
and  
Gravity Driven Cooling System (GDCS)**

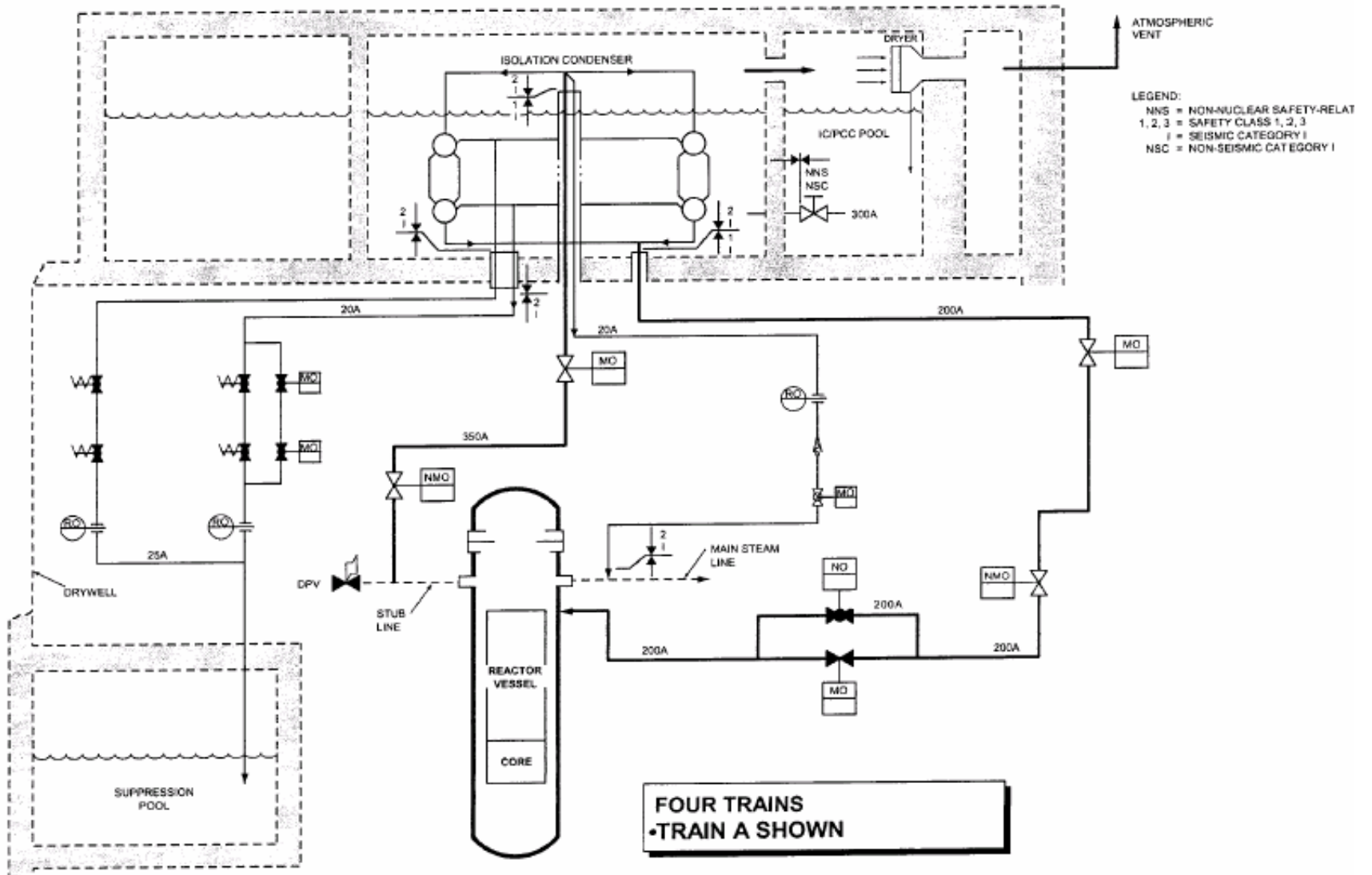
**Isolation Condenser System (ICS)**



# Containment Isolation (cont)

- Having both CIVs located in the primary containment should be acceptable
  - > Design constraints make having both valves located in the containment the best solution
- Isolation is only needed in the case of a break in system outside the primary containment
  - > IC system outside containment is ASME Section III Class 3, Seismic Category 1
  - > Both CIVs are protected from effects of a break requiring isolation
  - > CIVs will either be of a fail closed design or powered from redundant power sources

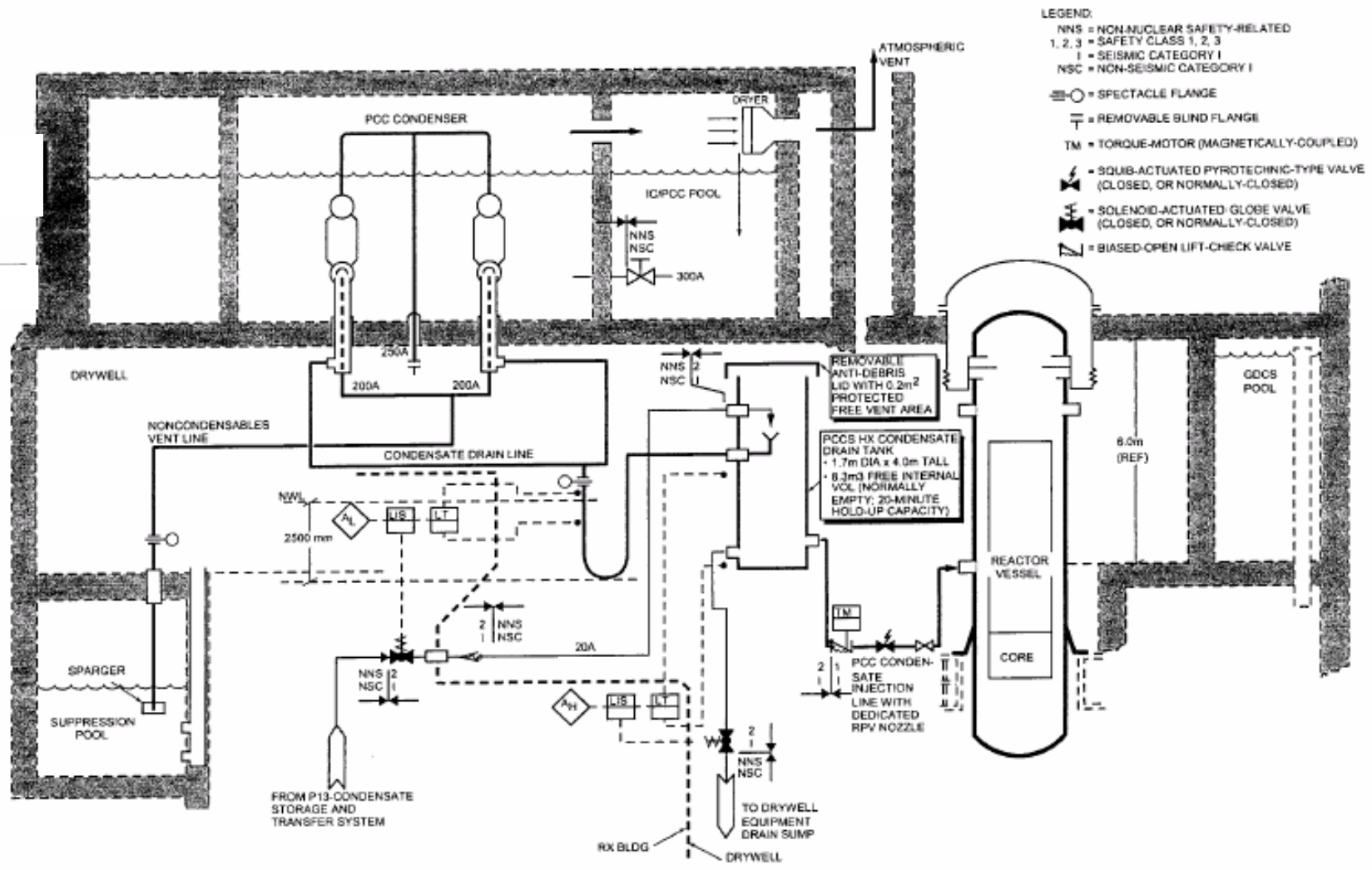
# ESBWR Isolation Condenser System - Schematic Diagram



# Containment Isolation (cont)

- Second exception is for the Passive Containment Cooling (PCC) system
  - > PCC is considered an extension of the primary containment boundary
  - > Closest applicable regulation is GDC 56
  - > PCC system is ASME Section III Class 2, Seismic Category 1
  - > PCC is designed for pressures 3 times greater than the design pressure of the primary containment
  - > There are no valves on the PCC system
    - No possibility that an inadvertent operator action could lead to a containment bypass

# ESBWR Enhanced Passive Containment Cooling System - Schematic Diagram



- LEGEND:
- NNS = NON-NUCLEAR SAFETY-RELATED
  - 1, 2, 3 = SAFETY CLASS 1, 2, 3
  - I = SEISMIC CATEGORY I
  - NSC = NON-SEISMIC CATEGORY I
  - = SPECTACLE FLANGE
  - ⊥ = REMOVABLE BLIND FLANGE
  - TM = TORQUE-MOTOR (MAGNETICALLY-COUPLED)
  - ⋈ = SOLENOID-ACTUATED PYROTECHNIC-TYPE VALVE (CLOSED, OR NORMALLY-CLOSED)
  - ⋈ = SOLENOID-ACTUATED GLOBE VALVE (CLOSED, OR NORMALLY-CLOSED)
  - ⋈ = BIASED-OPEN LIFT-CHECK VALVE



# Containment Isolation (cont)

- Isolation is not required since system is designed to appropriate criteria
  - > Isolation capability would reduce the reliability of PCC

# Summary

- The CIV configuration for the ICs with both automatic valves inside the primary containment is an acceptable alternative to the prescriptive requirements of GDC 55
- The PCC system is acceptable without isolation capability since it is designed to the applicable code criteria for primary containments.
  - > GDC 56 is not applicable since the PCCs are part of the containment boundary

# Requested NRC Actions

- Provide feedback on whether the location of both CIVs inside the primary containment on the IC steam supply and condensate return lines is likely to be acceptable
  - > This deviation from GDC 55 meets the intent
- Confirm that the PCC system can be considered part of the containment boundary and therefore not subject to GDC 56
  - > PCC design pressure exceeds primary containment by a factor of 3