Overview of PCC Operation and Test Programs

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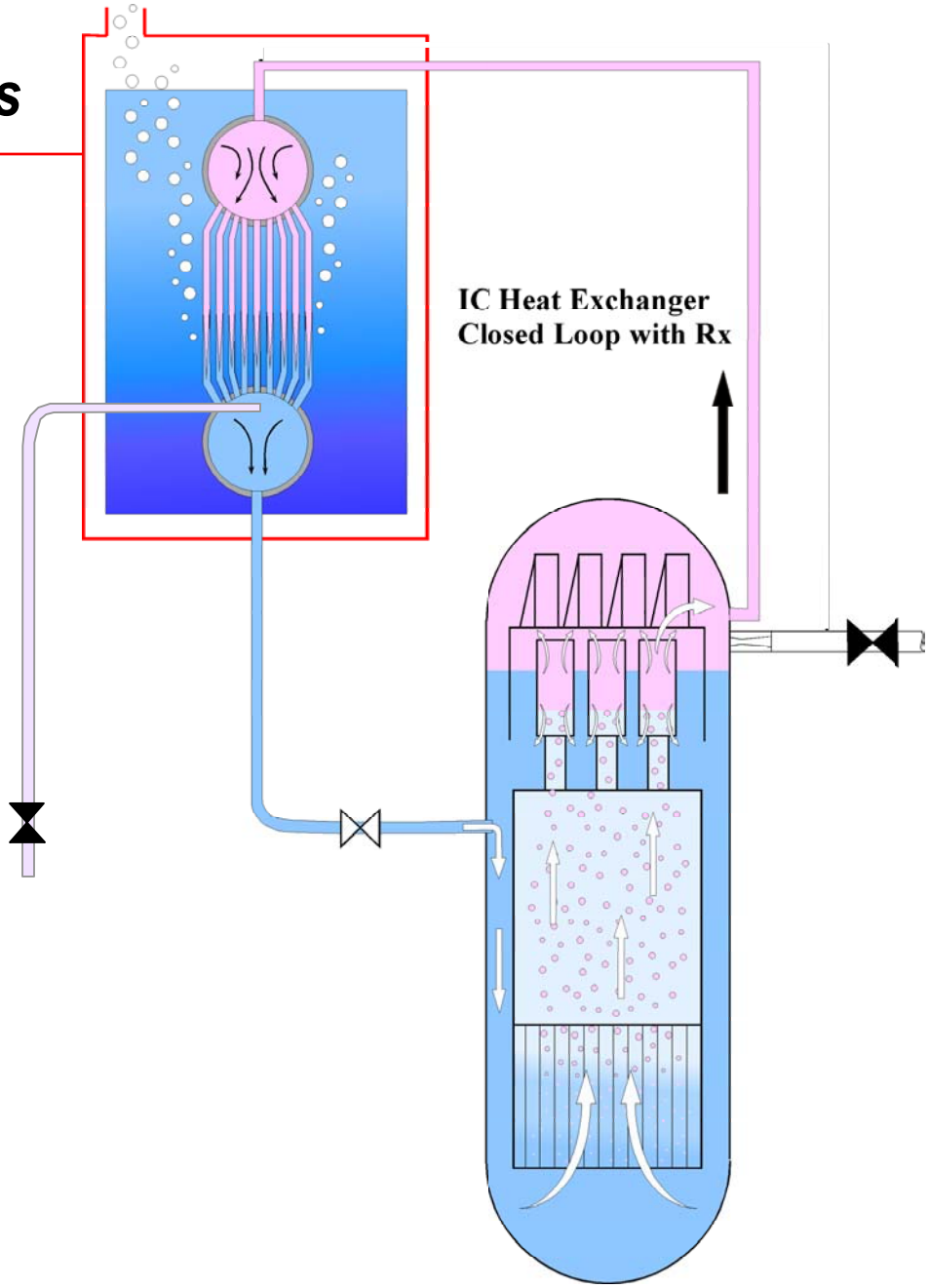
Outline

- ***PCC system and how it works***
- ***Integral system test example***
- ***Steady state test coverage of operation modes***

Condenser Pressure Requirements

- ***Condensers do not need a DW-WW pressure difference to condense steam***
- ***Pressure difference is only used to purge noncondensibles - when needed***
- ***This is demonstrated by IC operation***
  - Vent line is valved shut
  - Drain line exit pressure is higher than inlet pressure



PCC Operational Modes

PCC Operating Characteristics

- ***PCC heat removal rate is a function of***
  - Inlet noncondensible fraction
  - Stored noncondensibles
  - Pressure
  - Flow rate

PCC Operating Points

PCC Operating Points

PCC Operating Points – Adjusting to Decay Heat

PCC Operating Points – Vacuum Breaker Opening

PCC "System Response" Characteristics

Example of PCC Modes in PANDA Test

- ***A) PCC in Mode 1 – slowly purging N/Cs if needed***
- ***B) PCC capacity exceeds heat load***
  - Water enters PCC vent
  - N/Cs in inlet flow are insufficient to blanket PCC and equalize with heat load
  - DW pressure drops
- ***C) VB opens***
- ***D) PCC begins accumulating noncondensibles***
  - PCC capacity less than decay heat
  - DW slowly pressurizes
- ***E) PCC goes back to mode 1***
  - Load and rejection equalized

Containment Pressures

PCC Flow rates

PCC 1 Gas Temperatures (Top)

PCC 2 Gas Temperatures (Bottom)

Conclusions about PCC Operation

- ***Steam condensation creates a vacuum that draws flow into PCC***
  - The same condensation rate can occur over a range of DW-WW pressure differences (modes 1 to 4)
- ***The DW-WW pressure difference purges noncondensibles out of the PCC***
  - The delta-P must be sufficient to uncover the PCC vent
  - The DW pressure self-regulates relative to the WW pressure to purge noncondensibles from the PCC or to open the VB, as needed to help the PCC adjust to the decay heat load
- ***The PCC self-regulates to match the decay heat load***
  - Except when the load is greater than the maximum PCC capacity
  - In this mode excess steam is vented to suppression pool through the PCC vent

PANTHERS PCC Operational Modes and Test Coverage

TRACG PANTHERS/PCC Qualification Points (backup)