

Overview of PCC Operation and Test Programs

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Closed Session

June 25, 2003

Rockville, Maryland

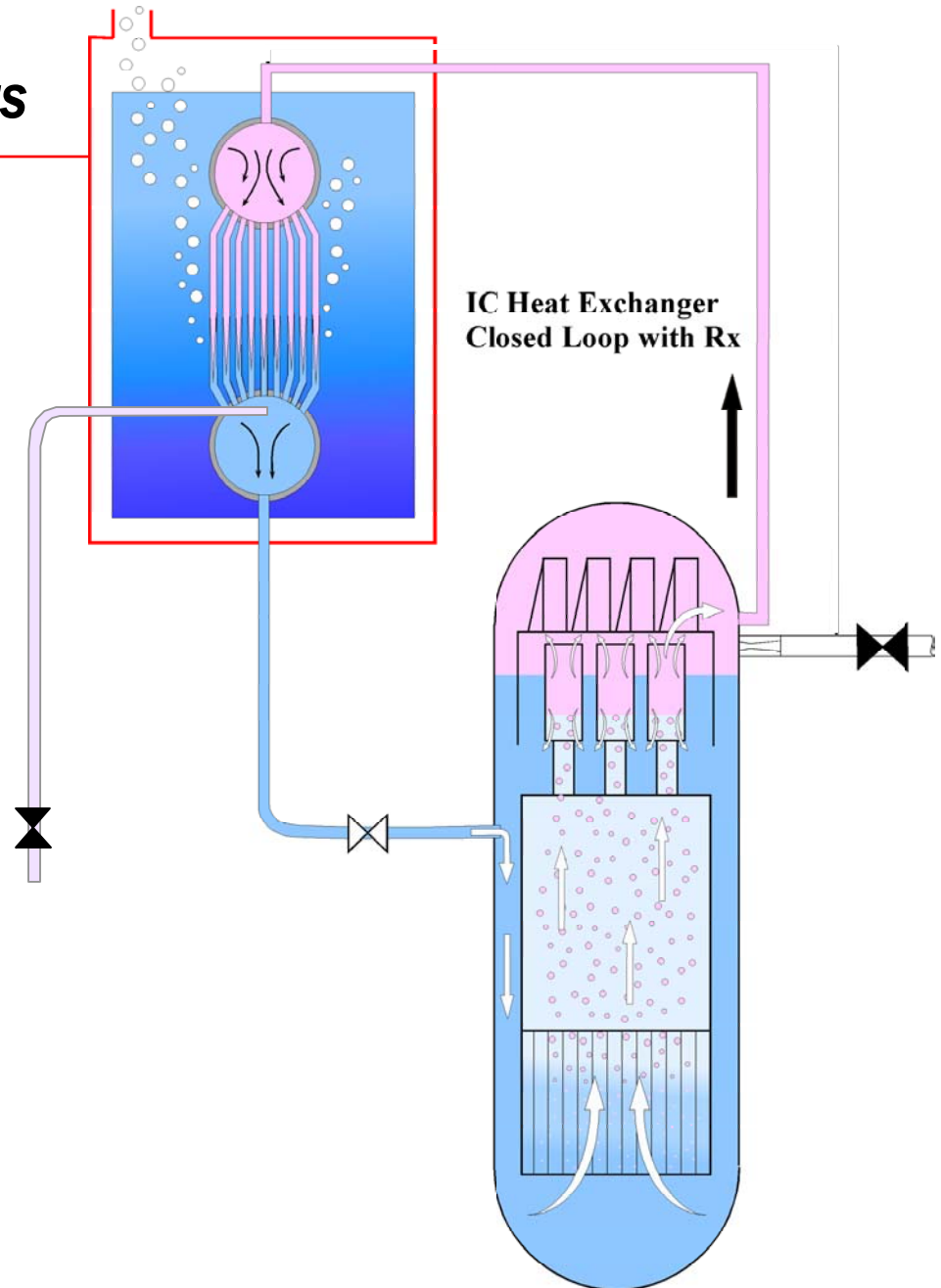


Outline

- ***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 noncondensable 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)
