TRTL Design
... and present open-ended issues to resolve

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2015 INTEGRATED RESEARCH PROJECT BIANNUAL MEETING
• **Primary Loop Fill**
P&ID

- Primary Loop Fill
- Primary Loop Circulation
P&ID

- Primary Loop Fill
- Primary Loop Circulation
- Secondary Loop Circulation
P&ID

- Primary Loop Fill
- Primary Loop Circulation
- Secondary Loop Circulation
- Primary Loop Heat Input
• Primary Loop Fill
• Primary Loop Circulation
• Secondary Loop Circulation
• Primary Loop Heat Input
• Secondary Loop Heat Output
P&ID

- Primary Loop Fill
- Primary Loop Circulation
- Secondary Loop Circulation
- Primary Loop Heat Input
- Secondary Loop Heat Output
- Primary Loop Pressurizing
**P&ID**

- **Primary Loop Fill**
- **Primary Loop Circulation**
- **Secondary Loop Circulation**
- **Primary Loop Heat Input**
- **Secondary Loop Heat Output**
- **Primary Loop Pressurizing**
- **Primary Loop Depressurization**
P&ID

- Primary Loop Fill
- Primary Loop Circulation
- Secondary Loop Circulation
- Primary Loop Heat Input
- Secondary Loop Heat Output
- Primary Loop Pressurizing
- Primary Loop Depressurization
- Primary Loop Over-pressurization
Functional Design

- Heater and Instrument Pass-thru
- Instrument ‘neck’ & gas plenum
- Inline heat exchanger
- Venturi flow meter
- Band (pre-conditioning) heaters
- Turbine flow meter
- Thermal expansion relief
- Suction side
- Discharge side
- Parker Circulating Pump
- Test section
Functional Design
Functional Design

7.25 psid
Functional Design

Loop psid = 18.4

or

~45.7 ft head
Test Section Instrumentation

• What do we want measured?
  • “Fuel” (heater) Temperature
  • Cladding Temperature
  • Fluid Temperature
  • Pressure
  • Pressure Drop
  • Flow Rate
  • ONB
    • Inferred
  • DNB
    • Binary (pressure drop)
    • Void Fraction

• Where do we want it measured?
Test Section Instrumentation

• ... how will we measured “it’”?
  • “Fuel” (heater) Temperature  3 Thermocouples
  • Cladding Temperature  3 thermocouples
  • Fluid Temperature  12 thermocouples
  • Pressure  2 pressure transducers
  • Pressure Drop
  • Flow Rate  2 flow meters
  • ONB
    • Inferred pressure and fluid temperature measurement
  • DNB
    • Binary (pressure drop) differential pressure
    • Void Fraction not yet included
Thank You