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# **PH1-05 and Module Readiness Review**

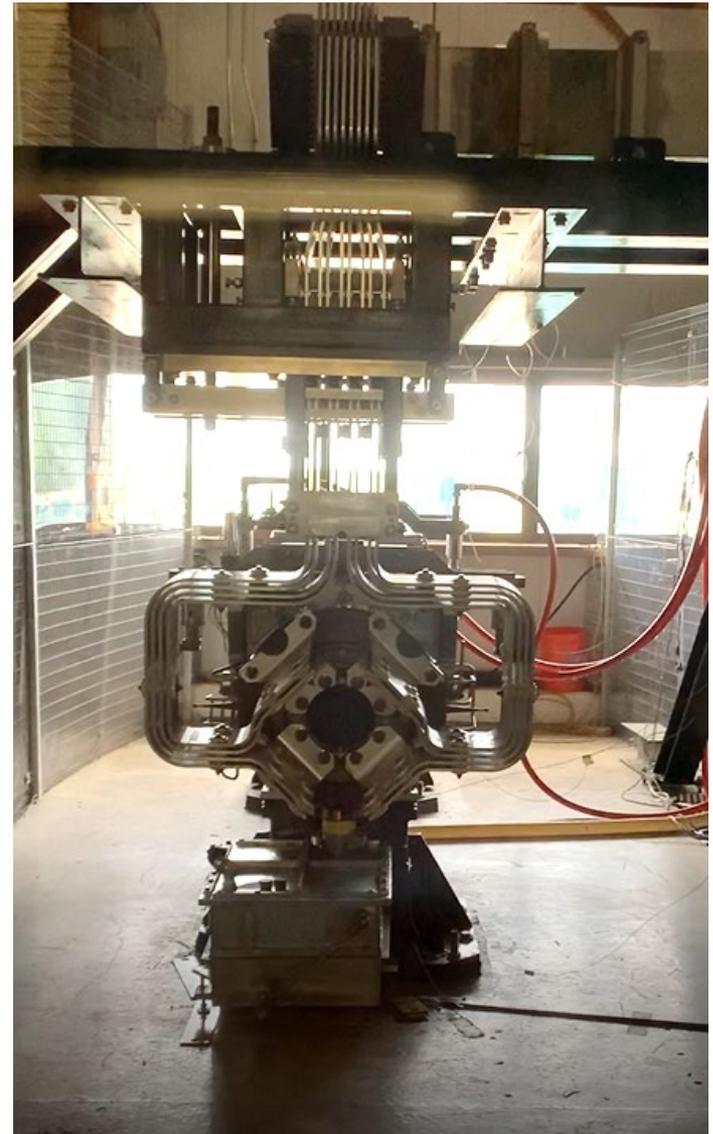
## **PH1-05 Pulse Testing Status**

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August 21, 2020

# Outline

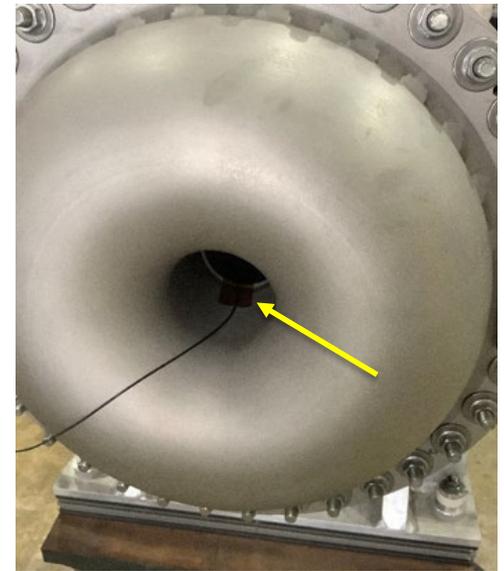
- Pulse testing objectives
- Challenges
- Progress and results
- Outlook and remaining tasks prior to install



*PH1-05 on test stand*

## Pulse testing objectives

- 200 kA with 1.2 sec repetition rate
- 150,000 total pulses
- Monitor stripline current
- Monitor horn temperature
  - T1: Upstream inside inner conductor
  - T2: Outside outer conductor
  - T3: Downstream inside inner conductor
  - T4: Inside stripline
- Develop comprehensive pulse testing operation procedure
  - Include lessons learned this year's pulse testing



*T1 thermocouple location*



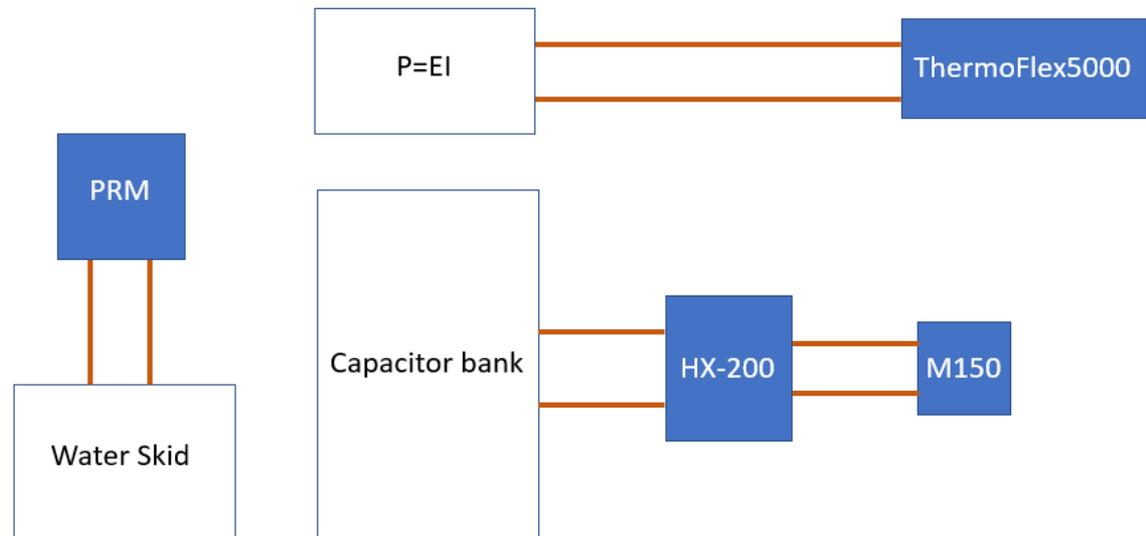
*T4 thermocouple location*

# Challenges

- P=EI DC charging source tripping
  - Overcurrent conditions
  - Failure of modules
- Several chiller problems
  - Pump failure on HX-200 chiller
    - Bypassed using external pump but still unable to cool water skid
  - HX-500 chiller constant set point error
    - Rejected large heat load to secondary chiller greater than its cooling capacity
  - Impeller failure on HX-150 chiller
  - HX-200 R-22 refrigerant needs to be charged

# Challenges

- Eventual solution:
  - PRM chiller to cool water skid
  - HX-200 with secondary chiller to cool capacitor bank
  - Change rep rate from 1.2 sec to 1.8 sec

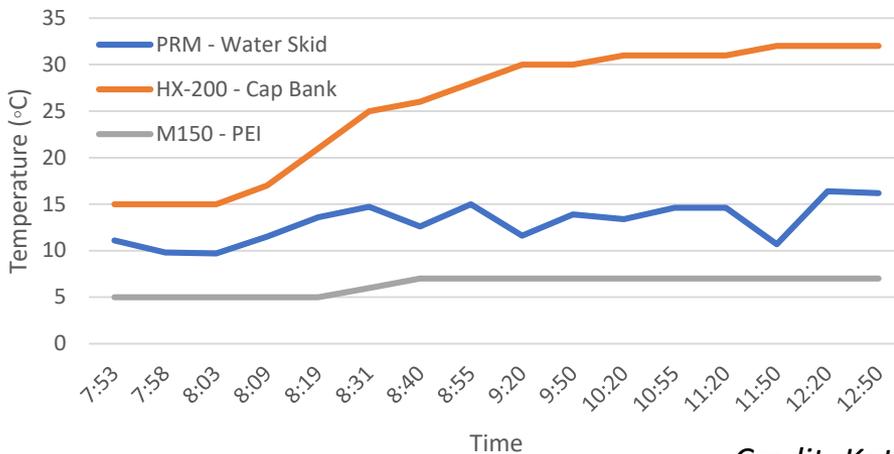


*Final chiller circuits*

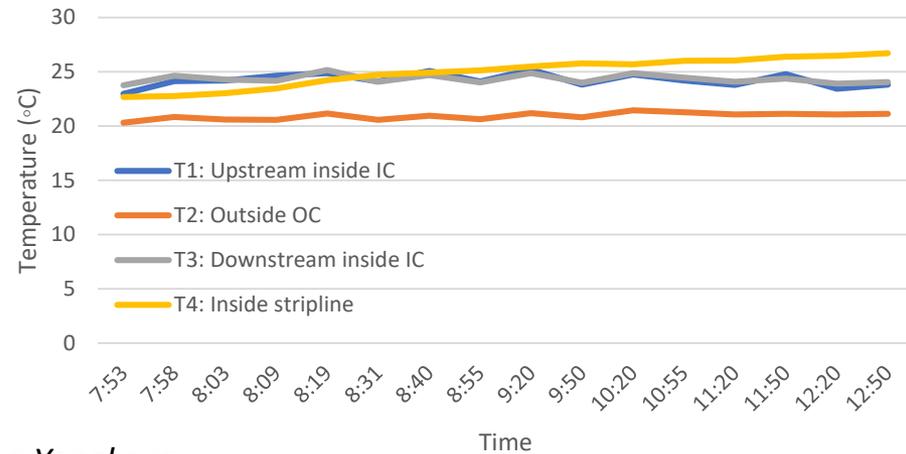
# Pulse testing results

- Pulsing 6 hours/day since 8/14
- 96,889 pulses as of 8/20 EOD
- Chiller temperatures stable
  - No trips since implementation of 1.8 s rep rate and PRM install
- Horn thermocouple temperatures remain stable and cool

Chiller Temperatures 8/18/2020



PH1-05 Temperatures 8/18/2020



Credit: Katsuya Yonehara

## Outlook and remaining tasks

- 140,000 pulses expected 8/25
- Field mapping
  - Survey and alignment to install probe 8/26
  - Five days to field map
- Final outfitting
  - Reconnect PH1-05 to water tank
  - One day to complete
- Survey and alignment to re-verify fiducialization
- Earliest expected completion 9/4
- Future pulse testing will use new Mokon AC-1.5 chillers
  - ETA end of September 2020