

**Contract No:**

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# Operational Differences Between LANA75 and LANA85 Based Hydride Beds (U)

## Introduction

- LANA75 ( $\text{LaNi}_{4.25}\text{Al}_{0.75}$ ) historically used as hydride material at SRTE
- LANA85 ( $\text{LaNi}_{4.25}\text{Al}_{0.85}$ ) identified as potential alternative  
SRNL LANA85 Findings
- **Lower hydrogen capacity**
- **Lower plateau pressure at ambient temperature**
  - Better hydrogen retention
  - **Higher speed of absorption**

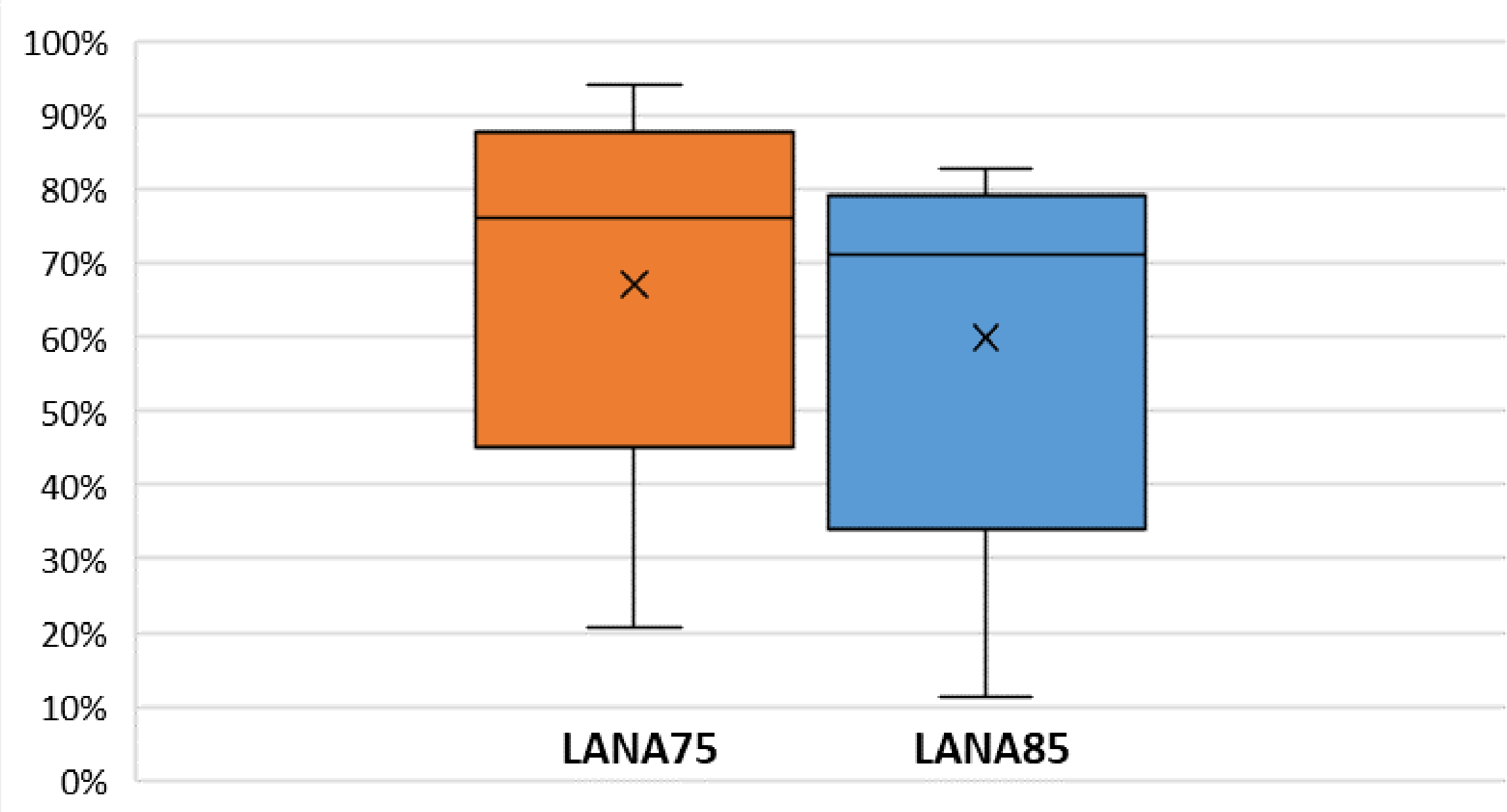
## Methods

- LANA85 and LANA75 beds recently installed in process
- Beds ran nominally in parallel
- Process trends were collected, analyzed, and compared

## Results

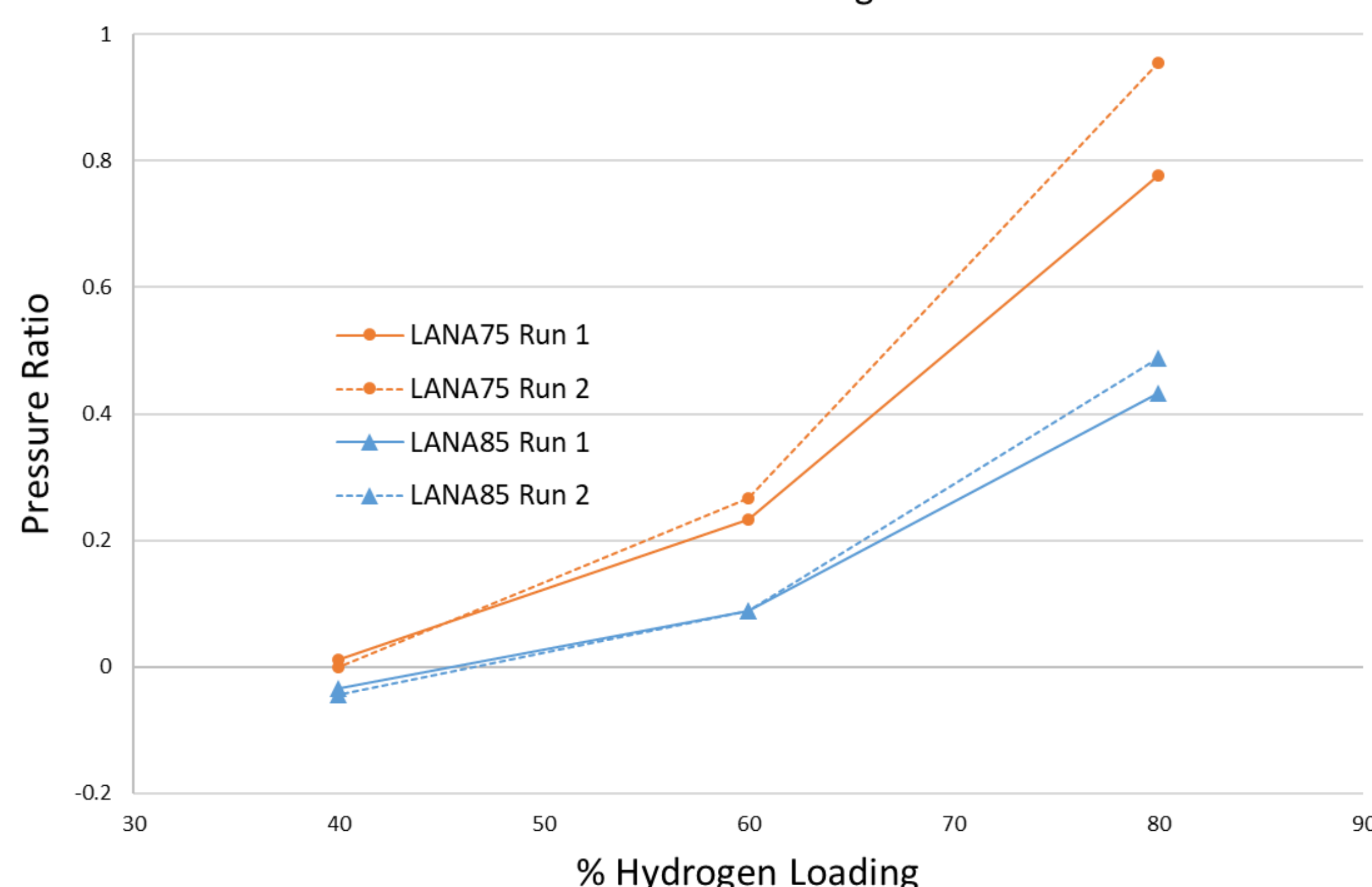
### Capacity

Hydride Bed Capacity



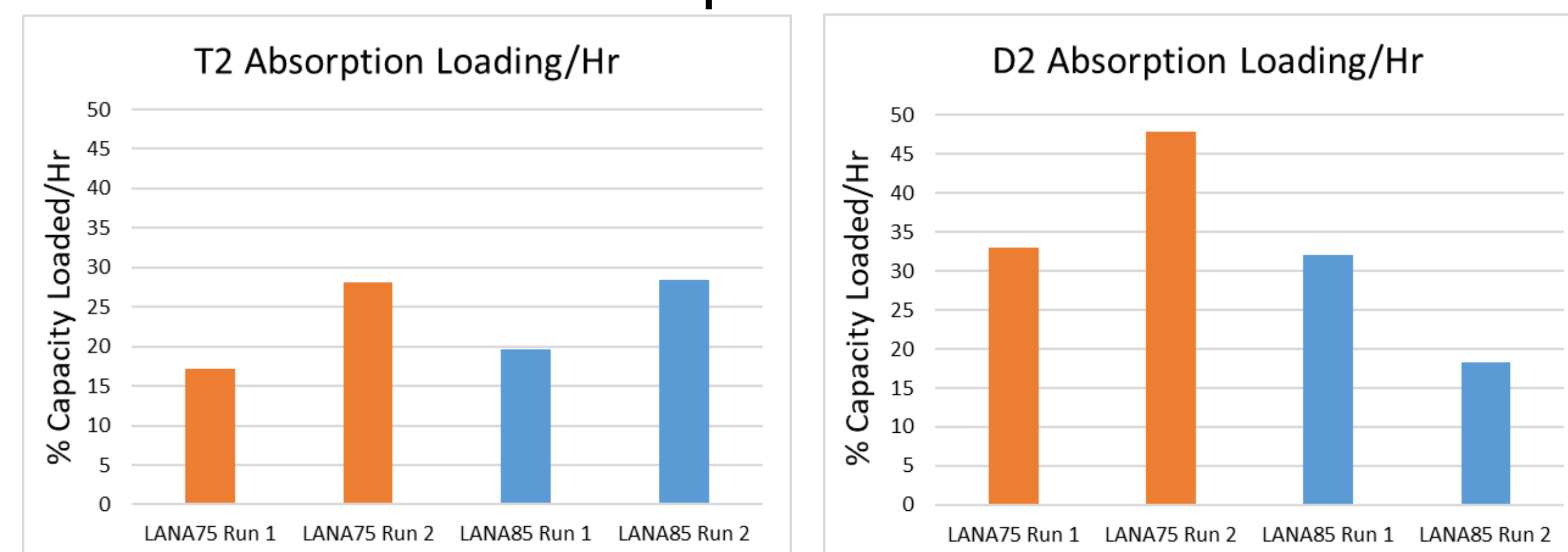
### Bed Overpressure

Pressure vs Loading



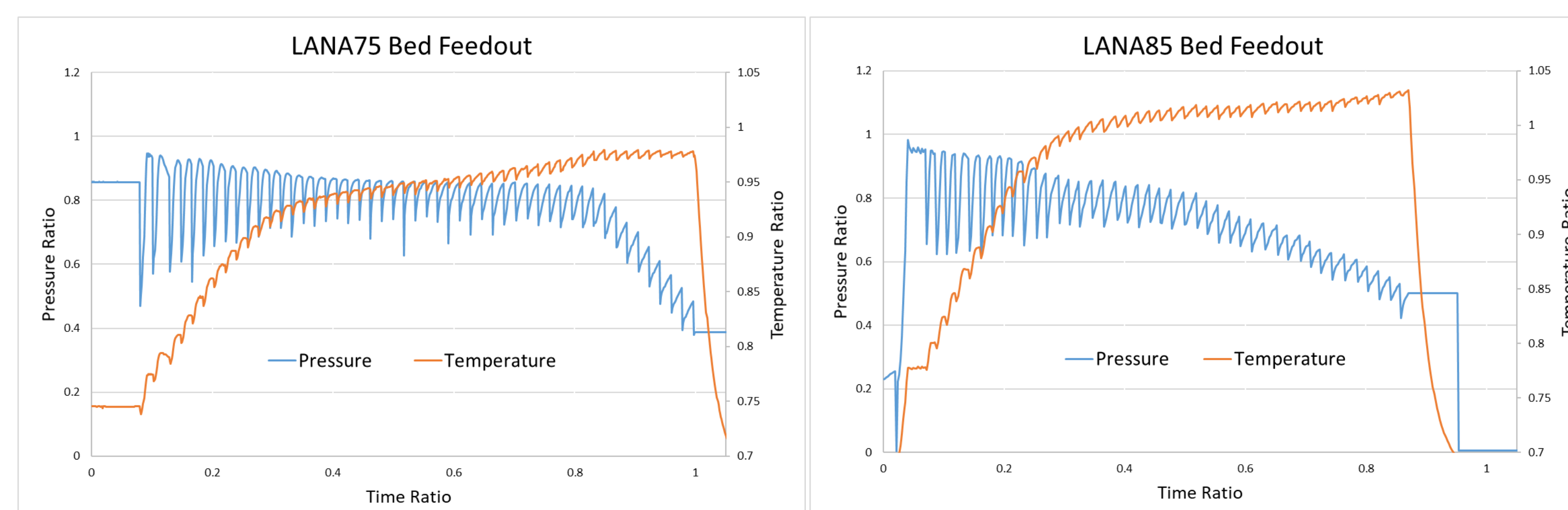
## Results

### Absorption Rate



## Discussion

- LANA85 has a lower capacity than LANA75
  - LANA85 requires a higher desorption temperature
  - LANA85 bed may not have been adequately heated resulting in residual hydrogen, reducing operational capacity.



- LANA85 has a lower plateau pressure than LANA75
- Hydrogen absorption rates inconclusive, influenced by other factors
  - Concentration of inert gases – Bed blanketing
  - Heat transfer – Limited cooling capacity
  - Human error – Operational differences

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DERIVATIVE CLASSIFIER: Zechariah Trotter, SRTE TED  
(NAME/PERSONAL IDENTIFIER AND POSITION TITLE)  
DATE: 10/6/2022

## Conclusion

- LANA85 bed capacity appears to be lower
  - Opportunity for parameter optimization
- LANA85 bed displays lower overpressure
  - Hydrogen retention during inert evacuation requires further study
- Absorption time unaffected by hydride material selection
- **Fluctuating process facility conditions obscure operational differences between LANA75 and LANA85**

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