



Chilled Water Efficiency

Breakdown of Strategies to Improve Performance
in Water Cooled Chillers

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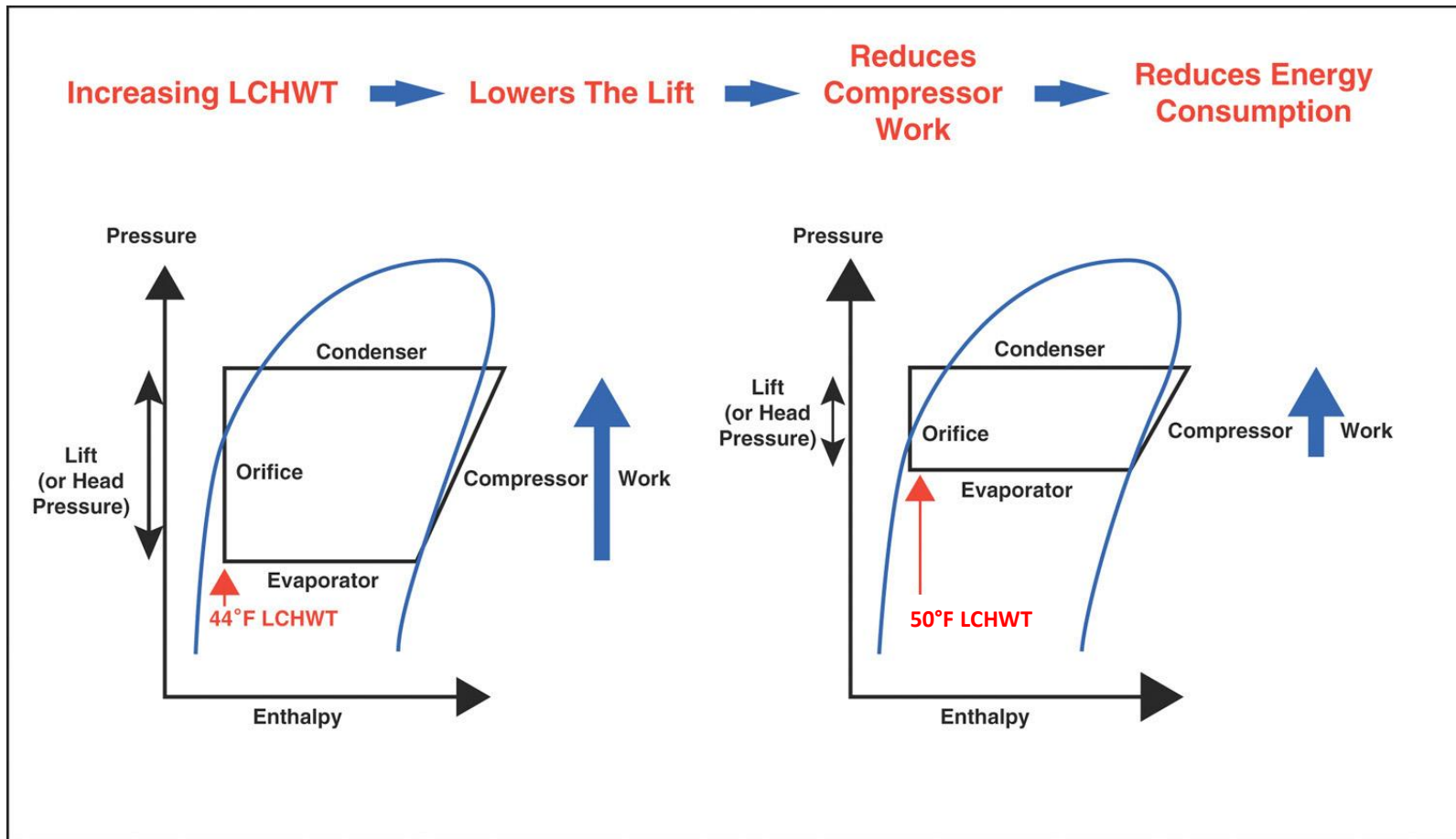
ETC Group, LLC

AIA Course Number: ETCL031121

AIA Provider Number: 50111116



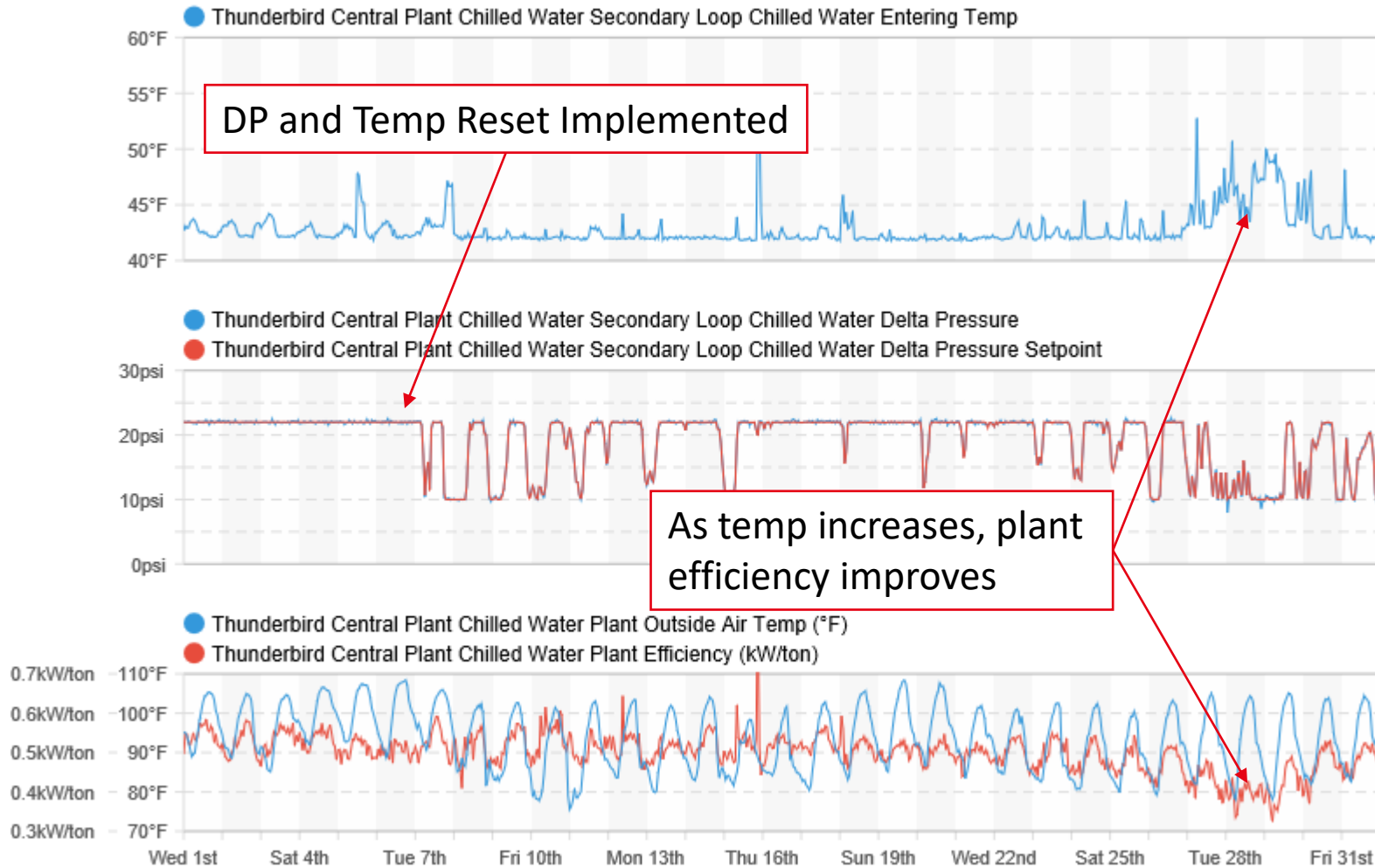
Chiller Work Impact from CHWT



Increased chilled water leaving temperature decreases lift and energy on the chiller compressor.



Chilled Water Pressure and Temp Reset





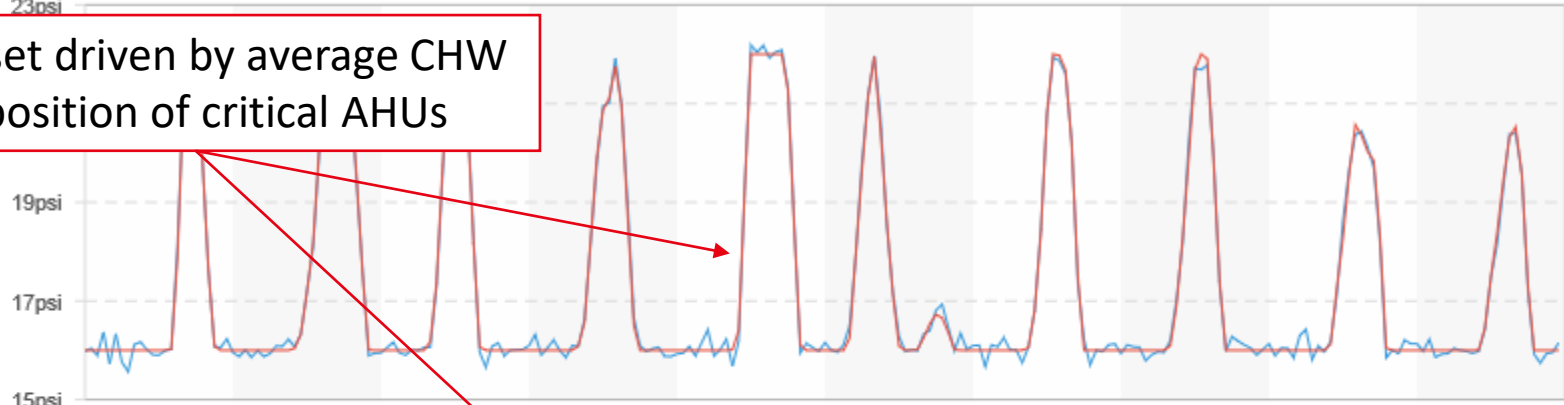
Airside Interaction with CHW

(How should we reset CHWST?)

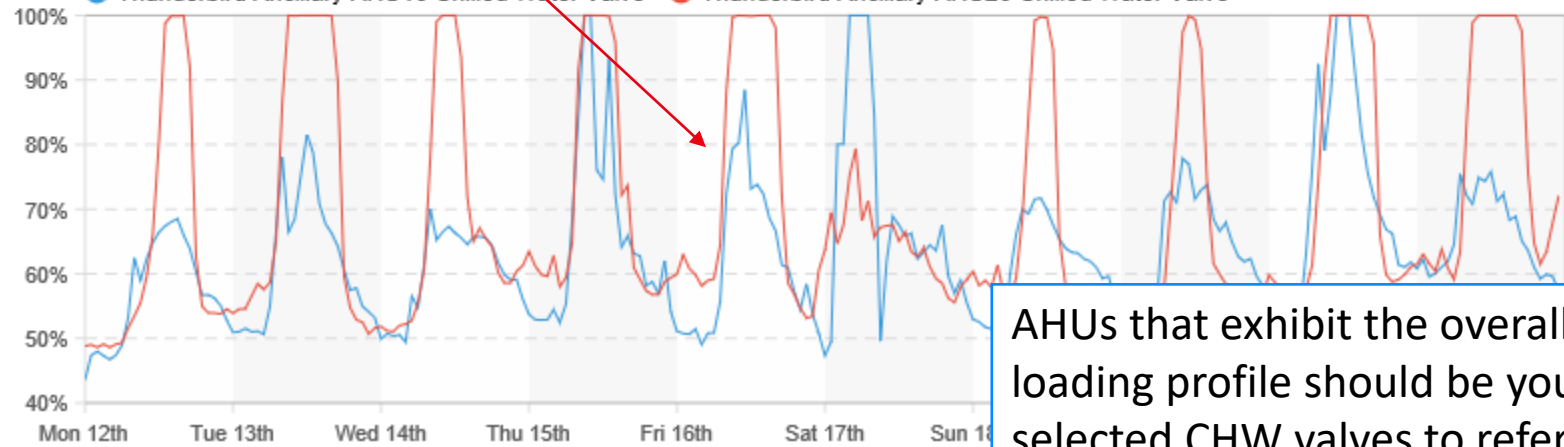
● Thunderbird Central Plant Chilled Water Secondary Loop Chilled Water Delta Pressure
● Thunderbird Central Plant Chilled Water Secondary Loop Chilled Water Delta Pressure Setpoint

23psi

DP Reset driven by average CHW valve position of critical AHUs



● Thunderbird Ancillary AHU16 Chilled Water Valve
● Thunderbird Ancillary AHU20 Chilled Water Valve

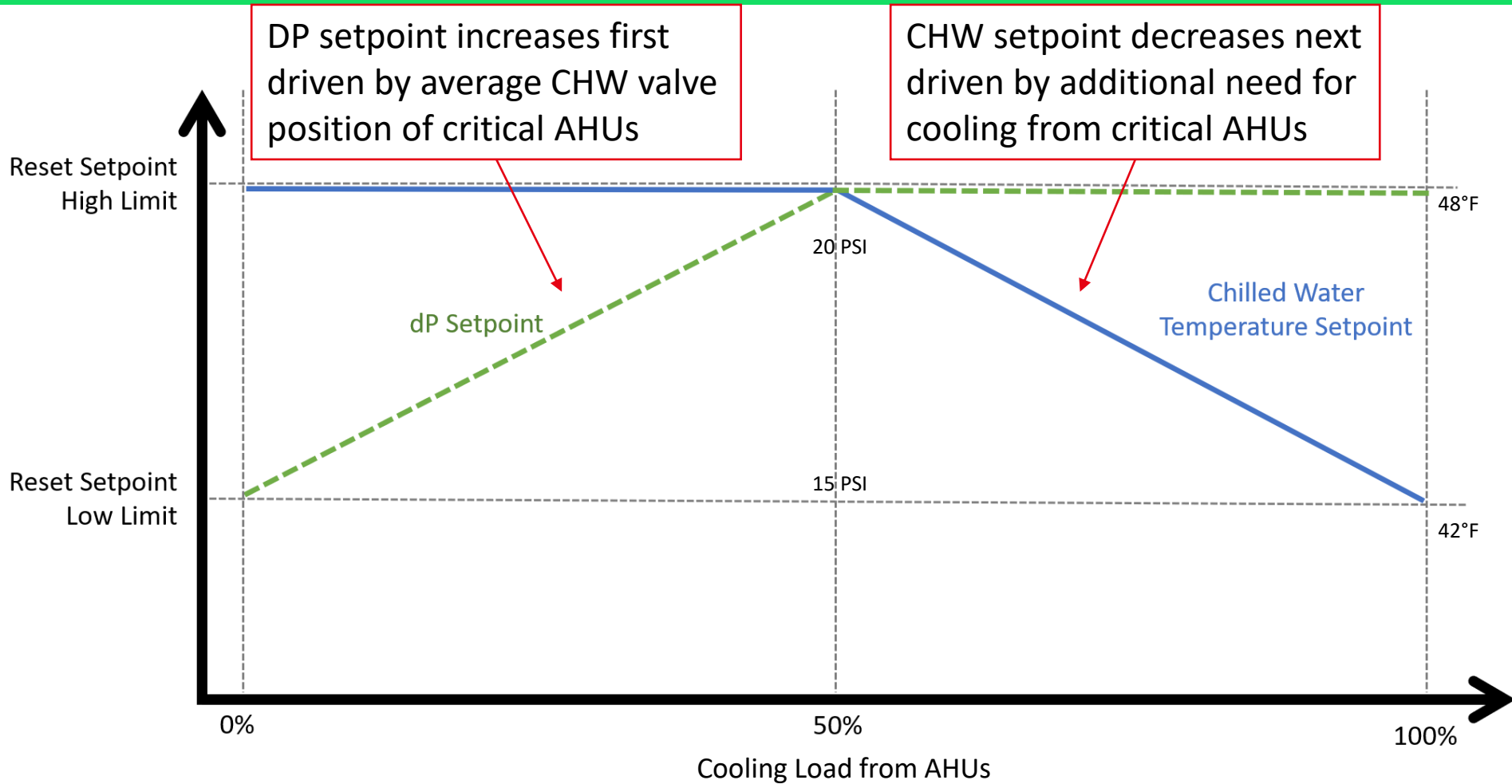


AHUs that exhibit the overall building loading profile should be your selected CHW valves to reference



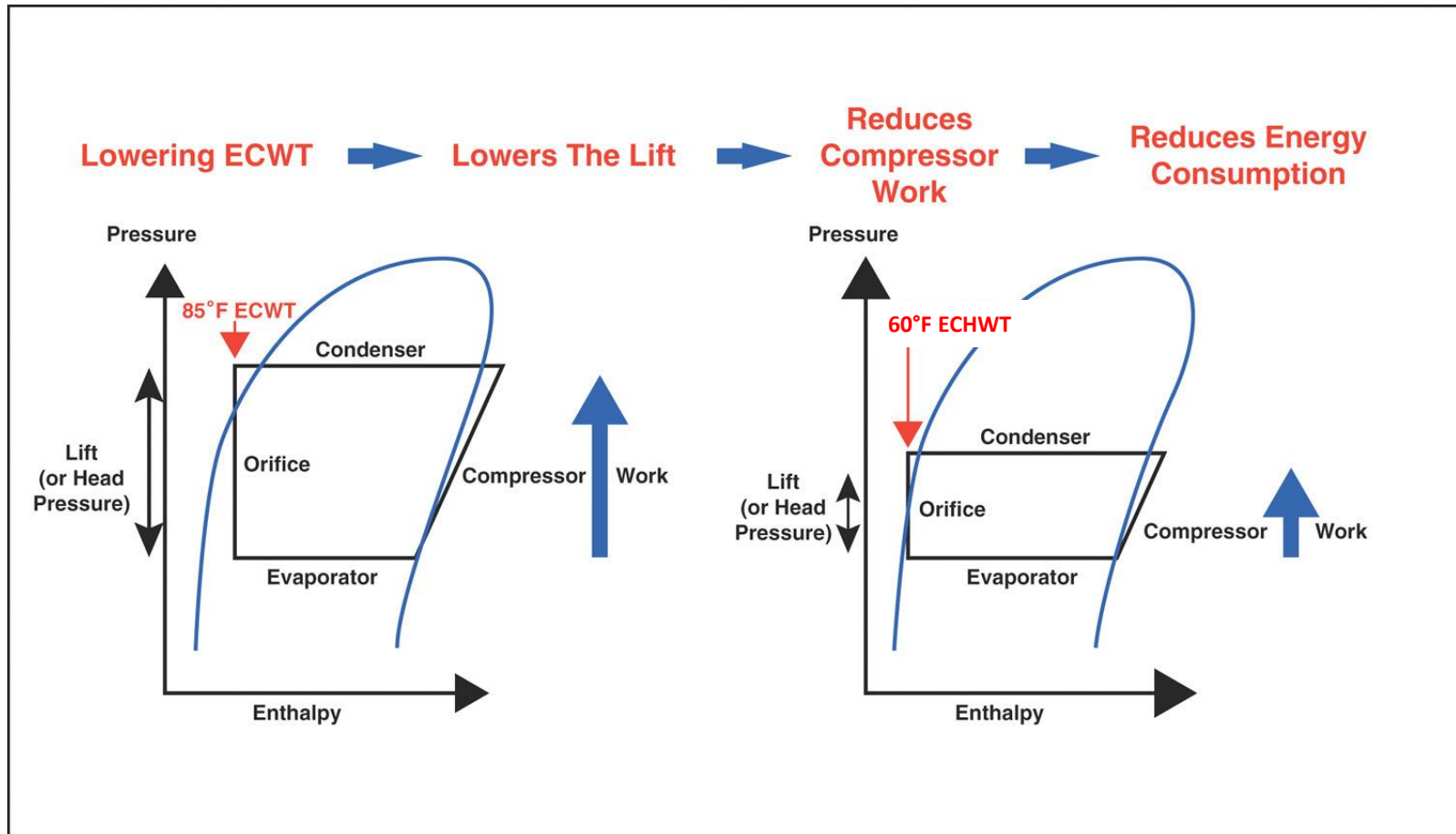
Airside Interaction with CHW

(Finding Optimal Tradeoff between dP and CHWST)





Chiller Work Impact from CWT

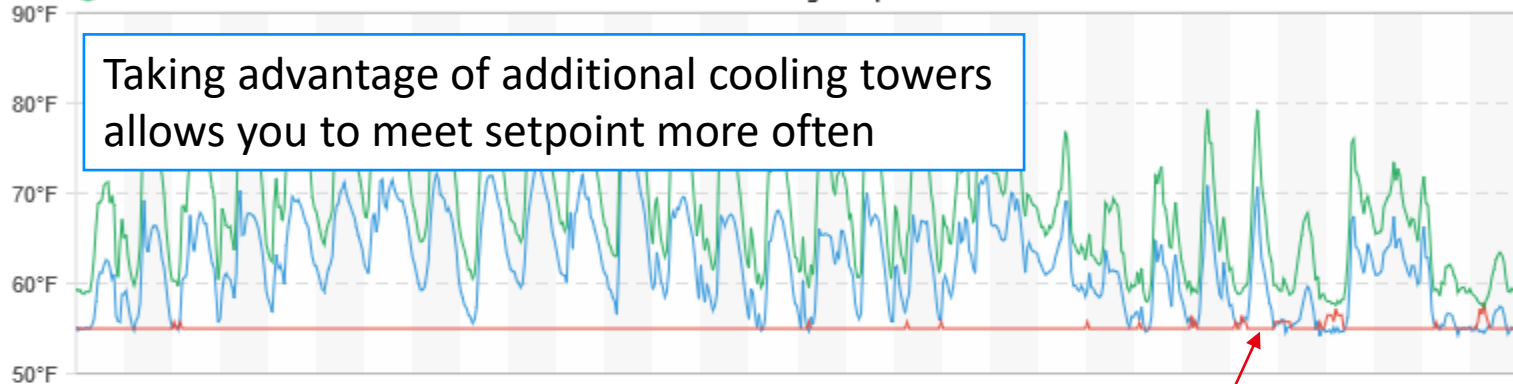


Decreased condenser water entering temperature decreases lift and energy on the chiller compressor

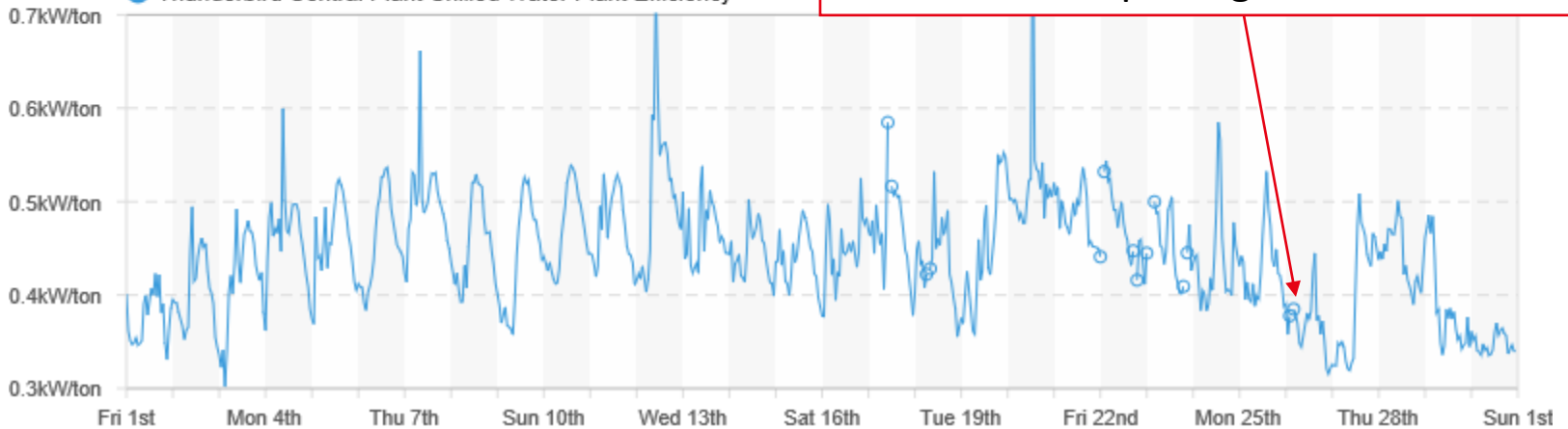


Chiller Work Impact from CWT

- Thunderbird Central Plant Chilled Water Plant Cond Water Entering Temp
- Thunderbird Central Plant Chilled Water Plant Cond Water Entering Temp Setpoint
- Thunderbird Central Plant Chilled Water Plant Cond Water Leaving Temp

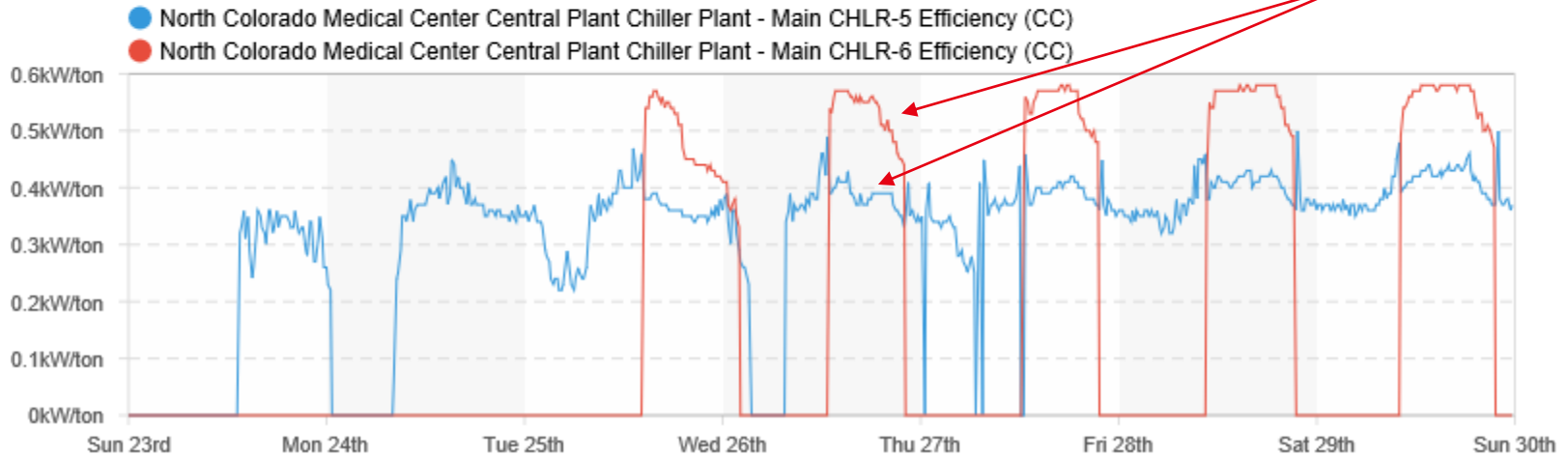
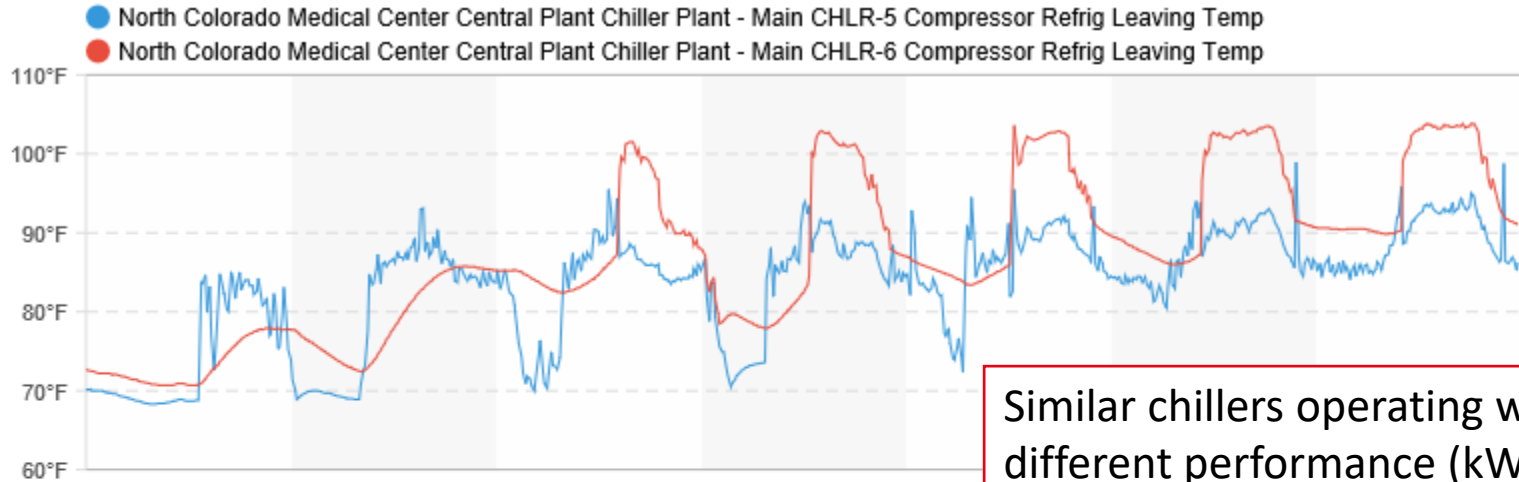


- Thunderbird Central Plant Chilled Water Plant Efficiency





Story Time – Chiller Mechanical Failures





Story Time – Chiller Mechanical Failures

Symptom:

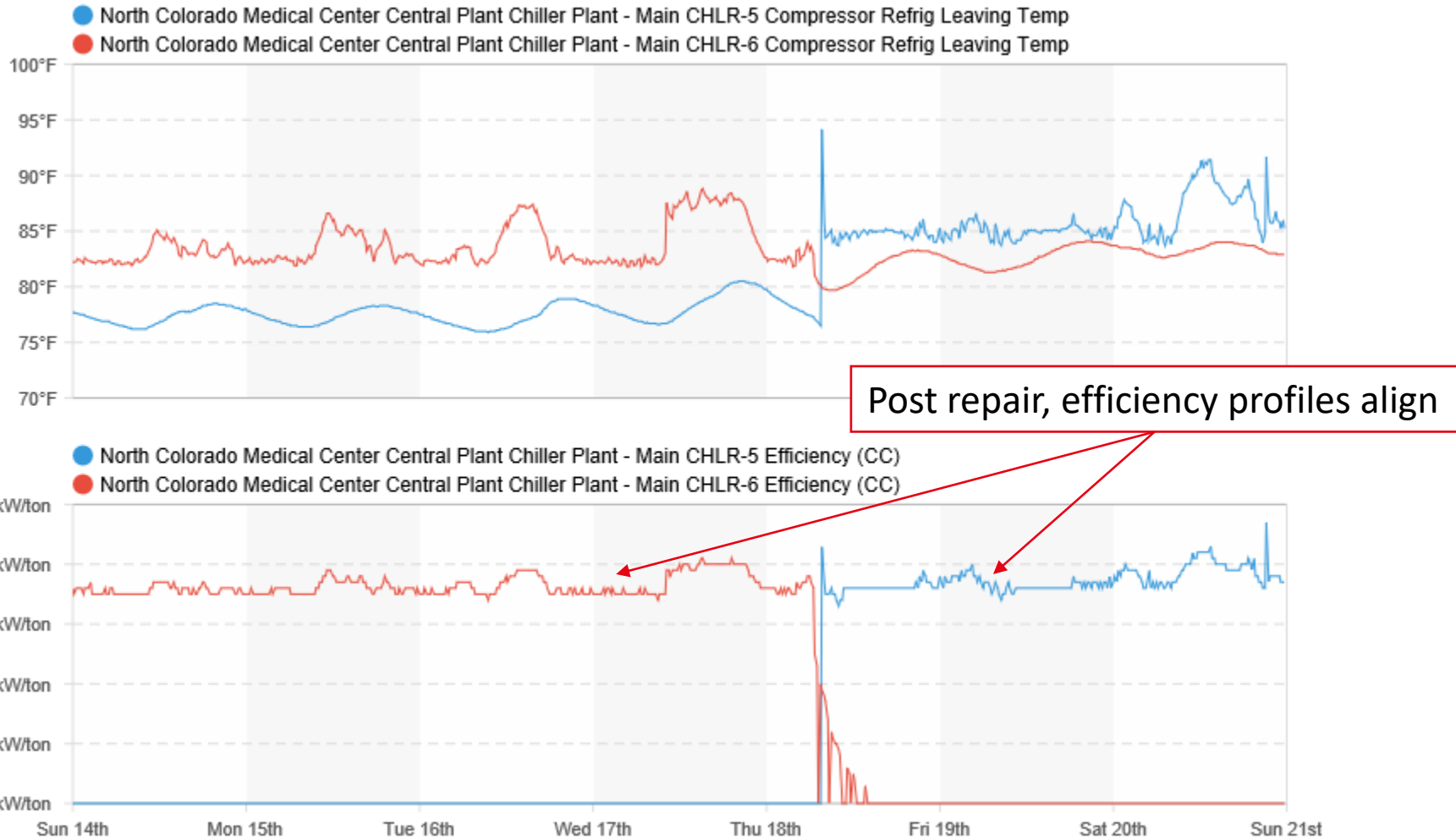
One chiller was much less efficient than its twin

Analysis/Investigation

1. Less efficient chiller had higher discharge refrigerant temperature.
2. Physically inspected chillers, manually modulated their inlet guide vanes.
3. Discovered that the VGDs of the two chillers were at physically different angles, despite operating at the same load. When commanded to open, one of them closed. (VGDs are used for capacity control on compressors).
4. Repaired and corrected the actuator installation.
5. Chiller performance immediately improved over 30% from 0.58 kW/ton to 0.4 kW/ton.



Story Time – Chiller Mechanical Failures





Questions

