

RICH EP Temperature Hardware Interlock Trip

August 7, 2018 at 11:46 AM

Tyler Lemon

August 8, 2018

EP Temperatures

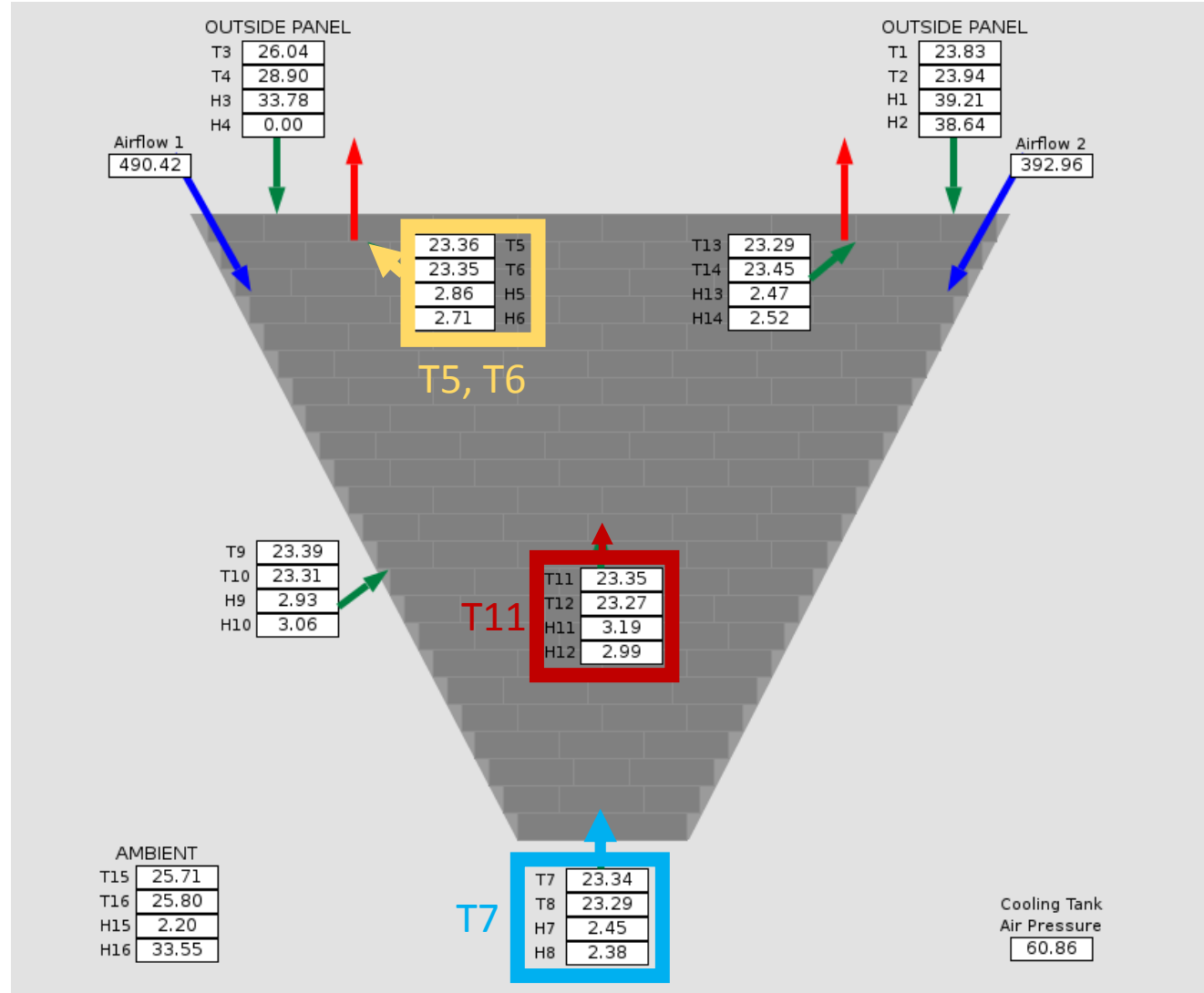
Interlock Trip at 11:46AM on August 7, 2018

Signal	Measurement	Units	High Limit Temp Limit [°C]
Temperature 5	44.0463	°C	44
Temperature 6	43.9583	°C	44
Temperature 7	39.63	°C	42
Temperature 8	39.4737	°C	44
Temperature 9	43.2233	°C	46
Temperature 10	43.074	°C	46
Temperature 11	44.2864	°C	46
Temperature 12	44.1679	°C	46
Temperature 13	42.0359	°C	45
Temperature 14	42.1515	°C	44
Airflow 1	482.394	slm	N/A
Airflow 2	397.811	slm	N/A

Interlocks that tripped

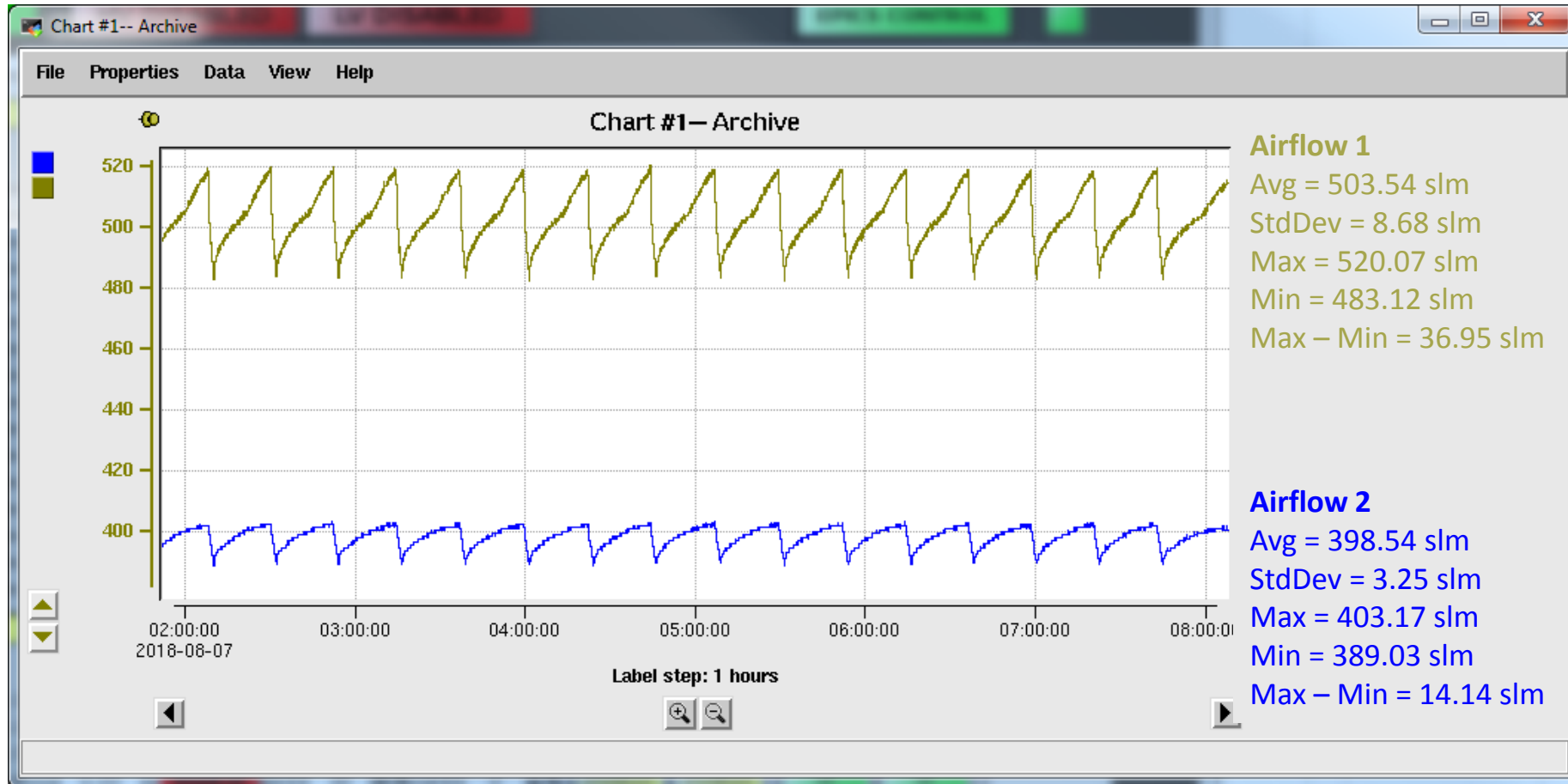
Difference between Highest and Lowest EP temperature
4.6564 °C

Sensor Locations in EP

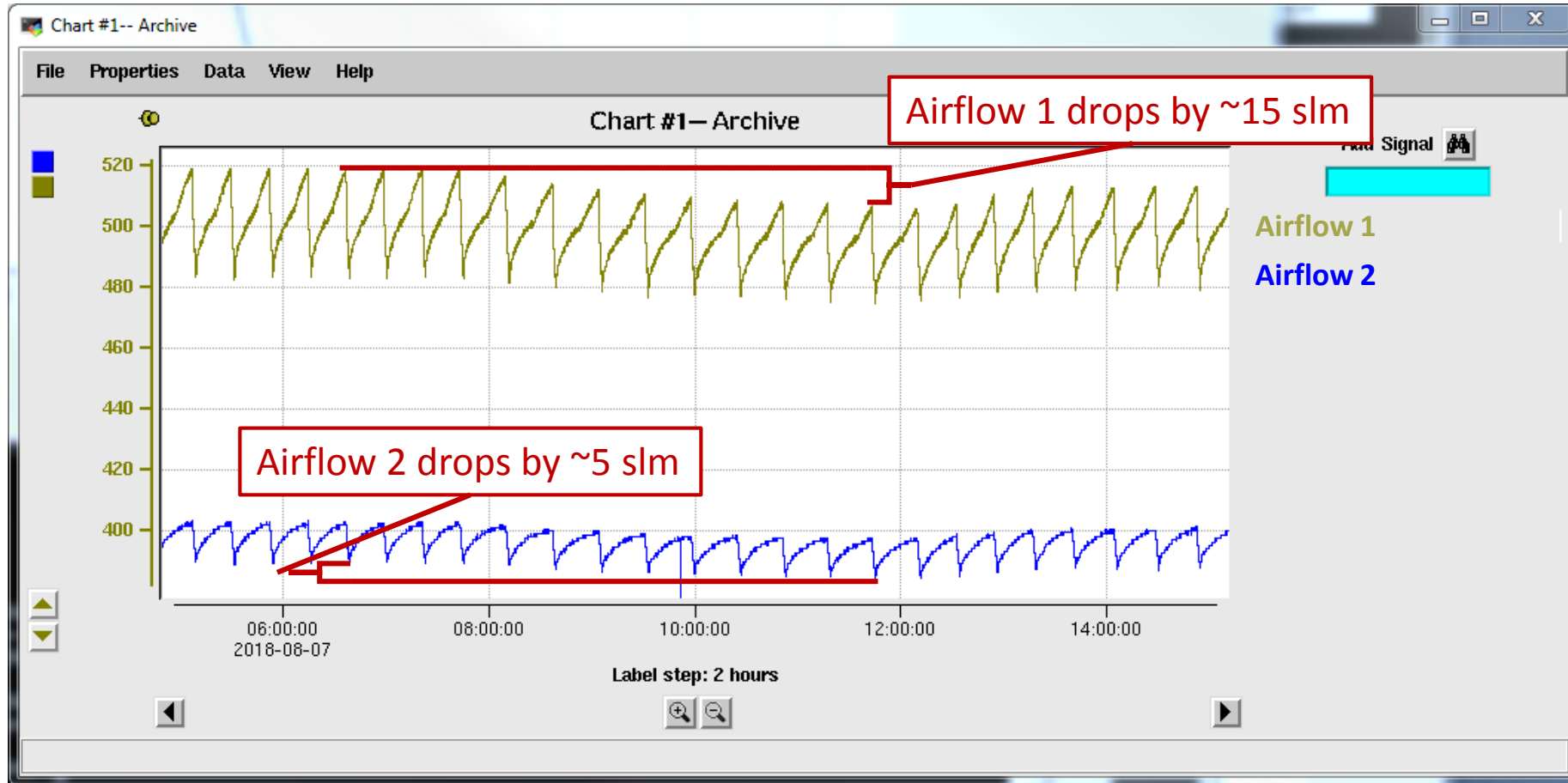


Normal Compressor Operations

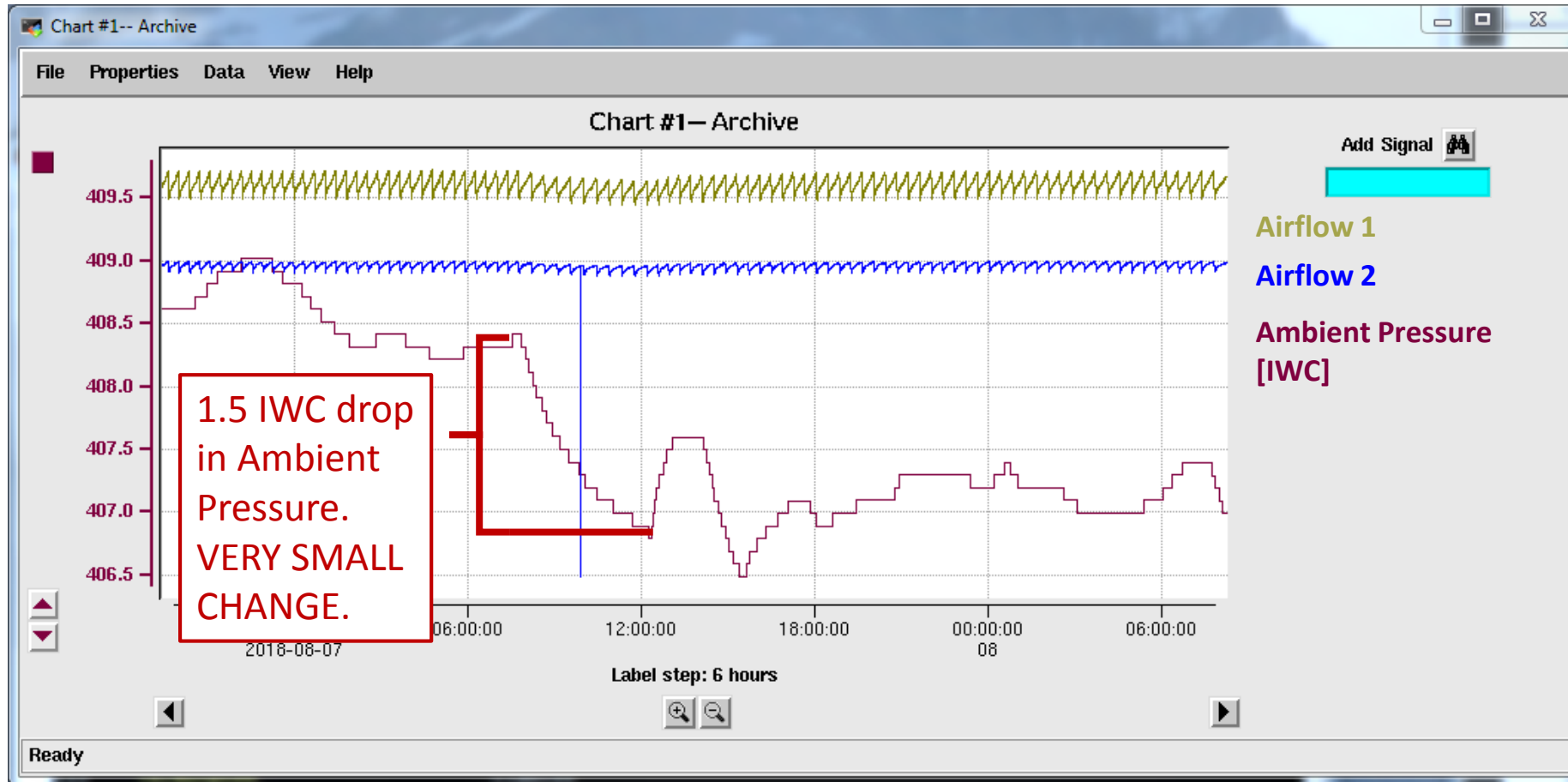
NOTE:
“Saw-tooth”
pattern on
airflow
caused by on-
off cycle of
compressor



Airflow Signal Changes

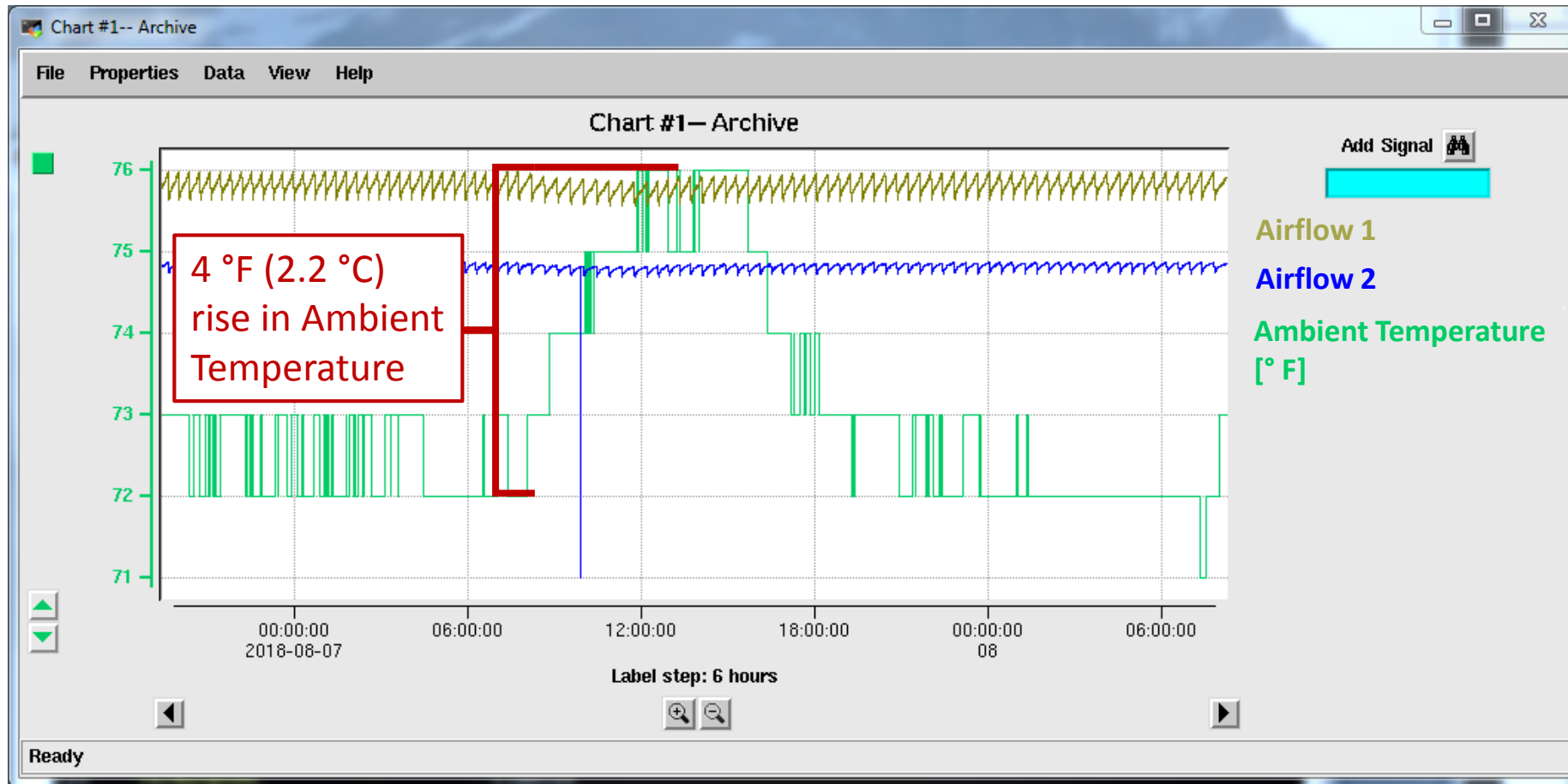


Ambient Pressure Change During Airflow Changes



It is unlikely that changes in Ambient Pressure are affecting airflow.

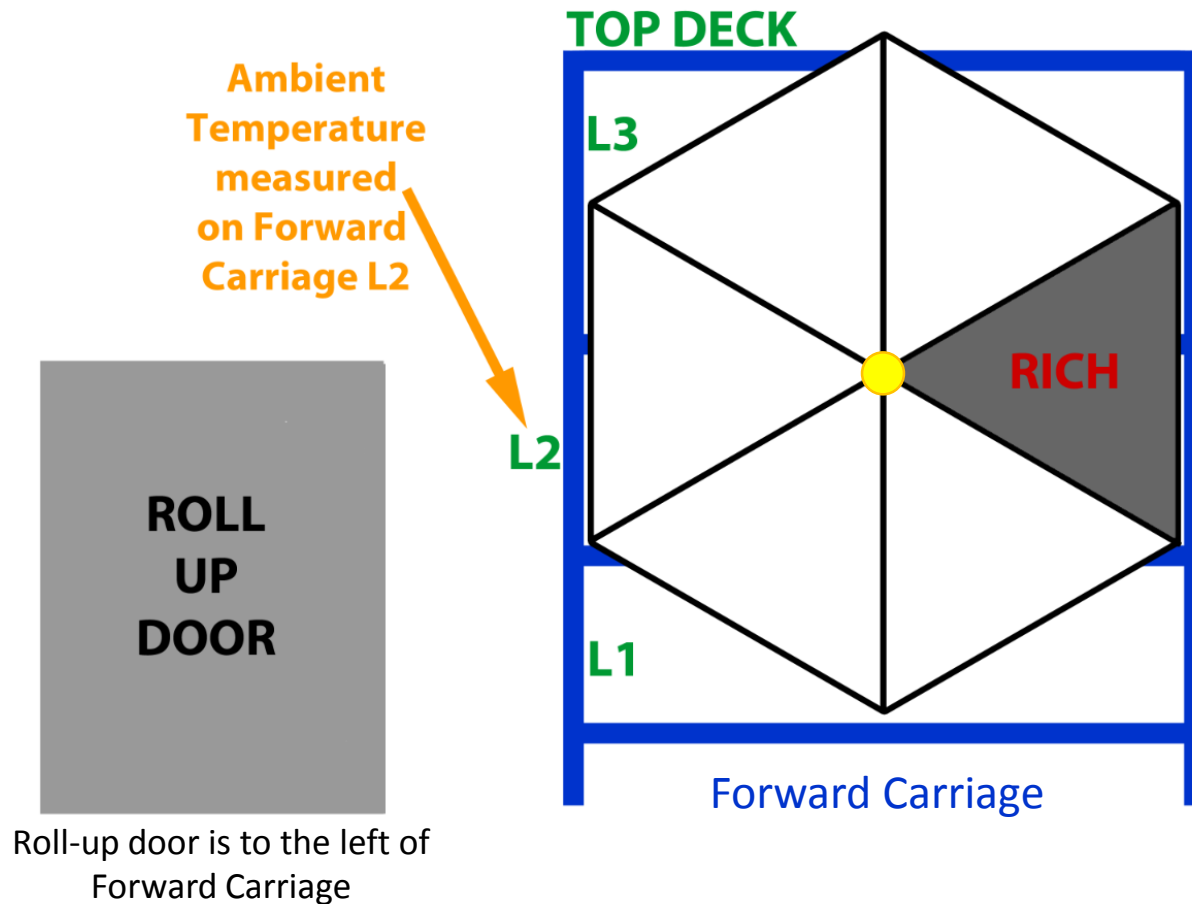
Ambient Temperature Change During Airflow Changes



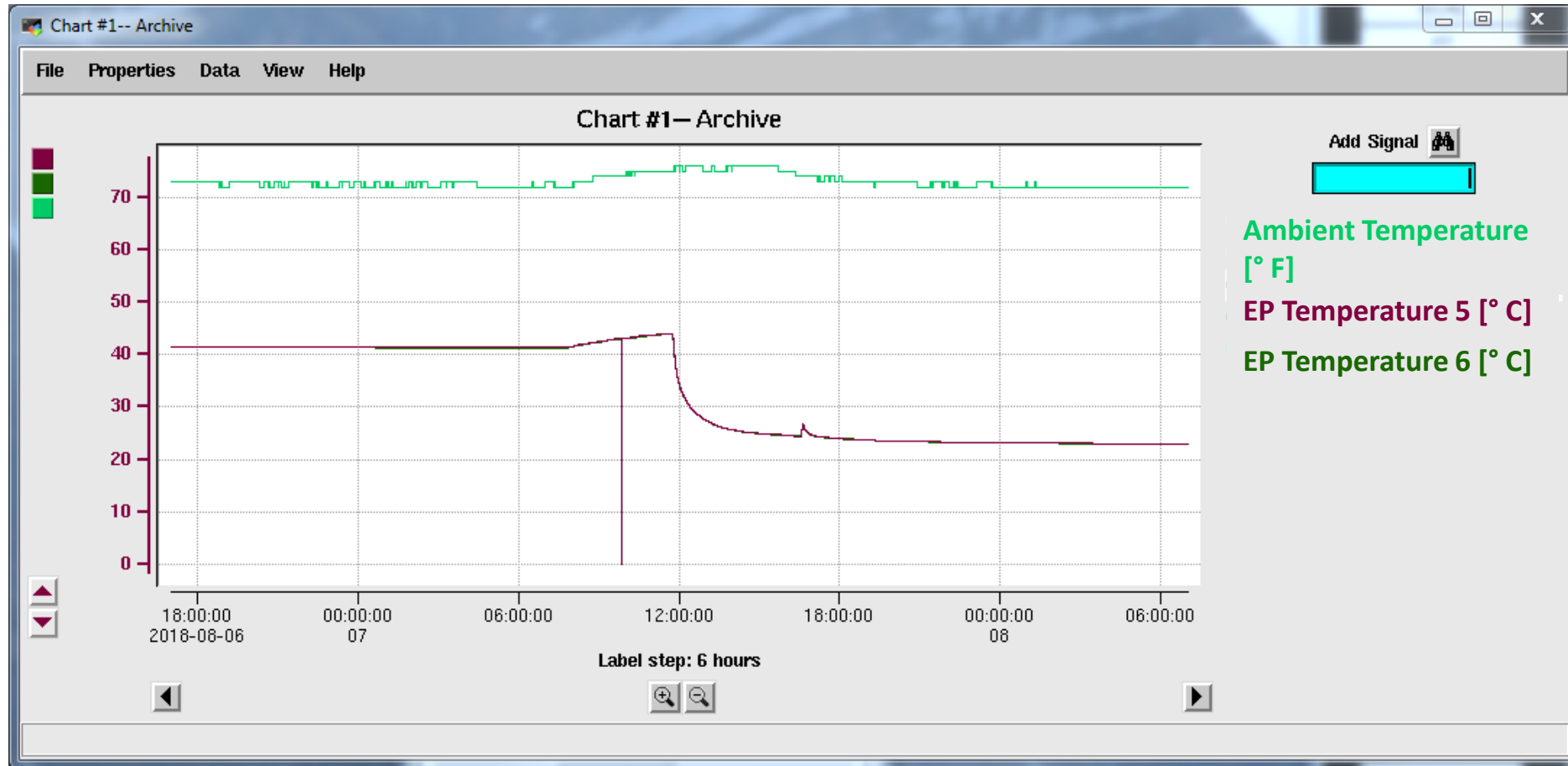
NOTE: Mass Flow Transducers are affected by changes in temperature. Changes in airflow observed may be due to 4 °F increase in Ambient Temperature, not actual flow changes.

Sketch of RICH Locations in Hall B

View is looking downstream with respect to beam



Direct Correlation Between Increases in Ambient Temperature and EP Temperatures



Potential Causes of Changes

- Changes in Hall B ambient pressure due roll-up door opening affecting cooling airflow.
 - Unlikely, as drop in pressure is small (only 1.5 IWC or 0.003 atm)
- Increase in ambient temperature in Hall B during day.
 - Most likely cause since Mass Flow Transducers are affected by changes in temperature.
 - Direct correlation observed between increases and ambient temperature and increases in EP temperatures.

Present Course of Action

- Thresholds for EP temperature sensors increased by 2 °C.
- RICH will remain powered off until Hall B ambient conditions become more stable or cause of changes is found
- DSG will move the Ambient EP temperature sensors (T15,16) from the rack near the cRIOs to the air-cooling buffer tank on the top deck of Forward Carriage.
 - Would give better indicator of temperature of cooling air before it flows into RICH.