

# SHUTDOWN ACTIVITIES

September 11 – December 31

Tanya Dax

# OVERVIEW

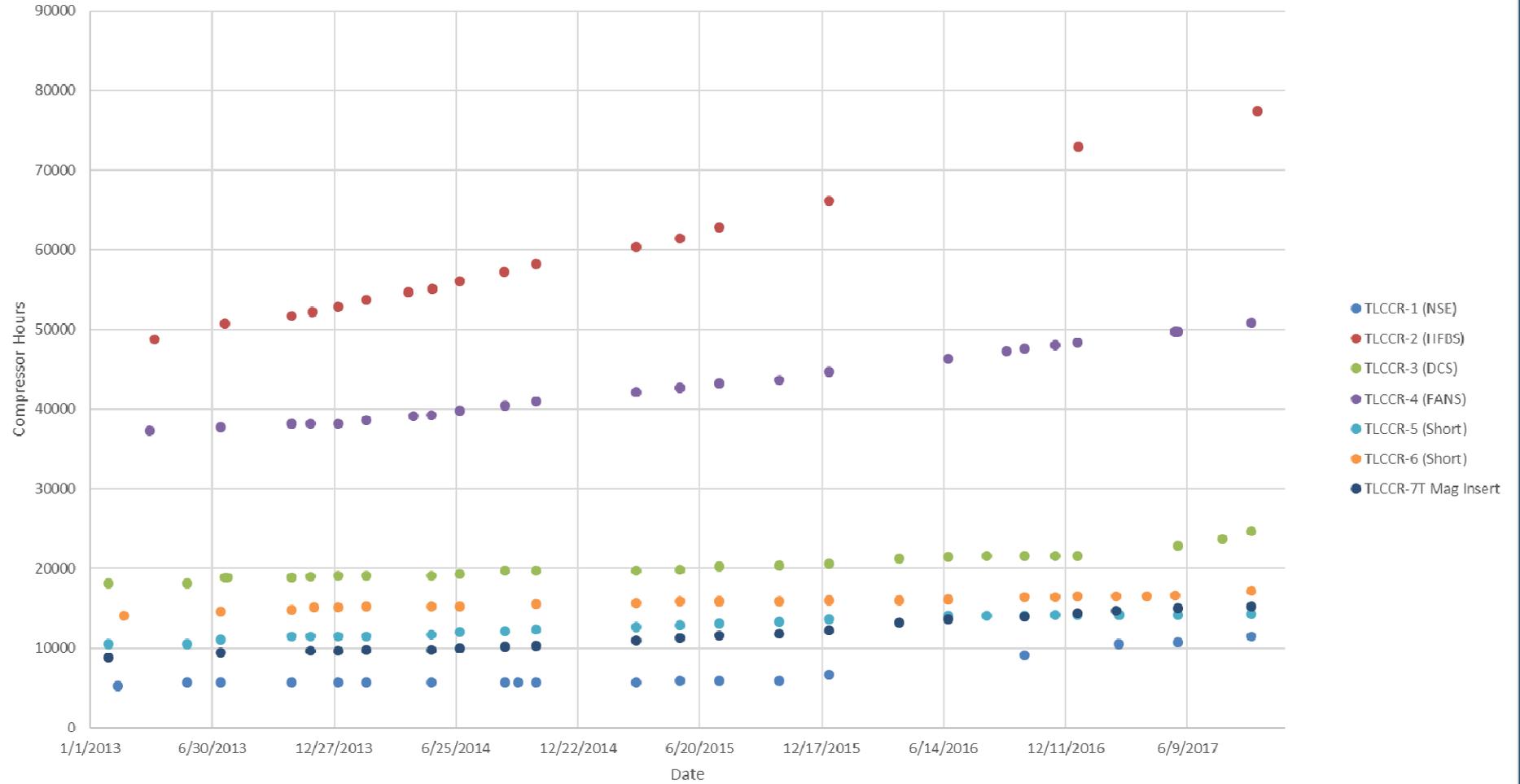
- Major maintenance
- Temperature sensing and control
- Minor maintenance
- Projects

# DISPLACER SERVICE

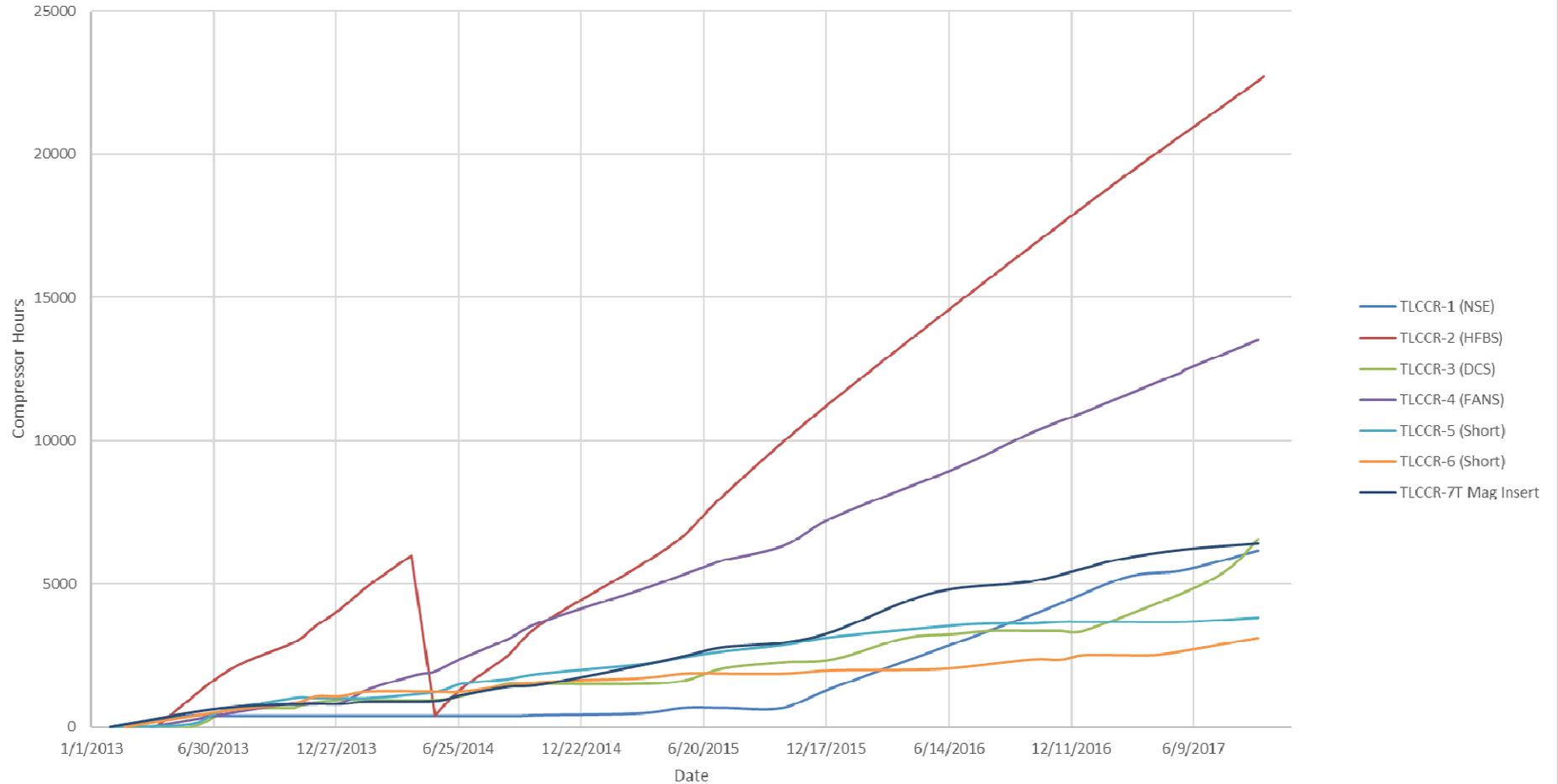
- SHI cold heads
  - 5 TLCCRs need to be sent in for full service
    - Spare 305D is in storage, needs testing and can be used on FANS or DCS
  - The 10T cold heads also need service, based on hours used
- ARS cold heads
  - Displacer maintenance can be done on site
  - 3 already done
  - 2 critically needed
  - 3 are low priority

Qty	Cold Head Model	Description	Range	Service Option
5	SHI RDK-305D	Top-Loading CCRs	4-600K	Vendor service only
12	SHI RDK-408D2	High-power bottom-loading CCRs, 10T Lemon, TLCCR-NSE, TLCCR-7T	2.7-325K 15-800K	Hot Swap and Exchange available
1	SHI RDK-415D2	10T Magnet		Hot Swap and Exchange available
2	SHI CH-204SFF	Midrange BLCCRs	10-420K	On-site vendor training and/or service
1	SHI RDK-101J	4-Circle Cradle BLCCR	2.7-325K	Vendor service only
8	ARS DE204S	All low-power, 5K BLCCR	5-325K	NCNR personnel service
2	Leybold RGD-510	High temperature BLCCRs	30-600K	Using until end of life

# Total Hours

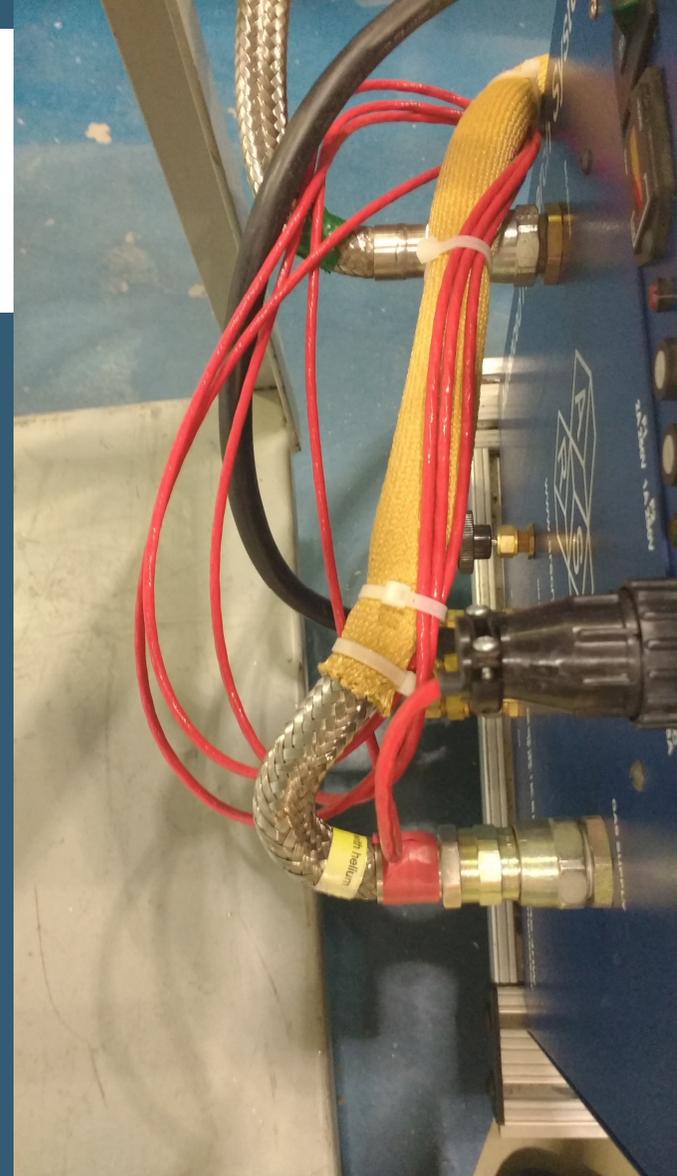
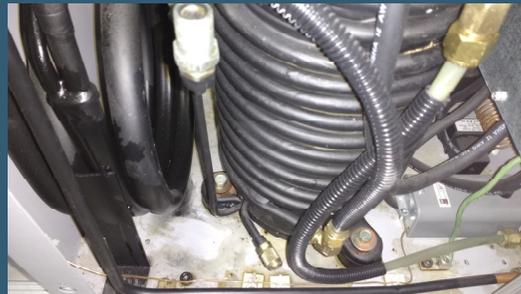


Hours Used Since 2013



# COMPRESSORS SERVICE

- Check water pumps for wear
- Flush with fresh water
- Replace adsorbers as needed
  - TLCCR-HFBS
  - TLCCR-DCS
  - TLCCR-FANS
- Replace bent helium lines
- Gas cleanup procedure



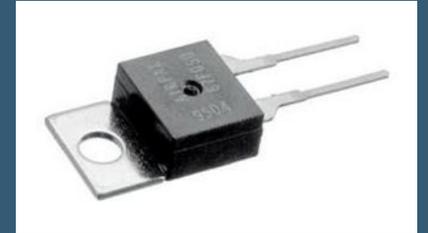
# OVERTEMP PROTECTION: PROBLEM

- OMEGA controllers: Thermocouple sensor input, controls at a variable temperature setpoint, opens the heater circuit if setpoint is exceeded.
  - Frequently opens heater when well below setpoint
  - Occasionally fails to open heater when it should
  - Can be adjusted by the user, rendering it pointless
  - Users forget to plug it in to power, walk away without confirming the heater is working
  - Thermocouple connections prone to damage from rough handling
- Solution: Replace the Omega controllers on 7 TLCCRs and 10 BLCCRs



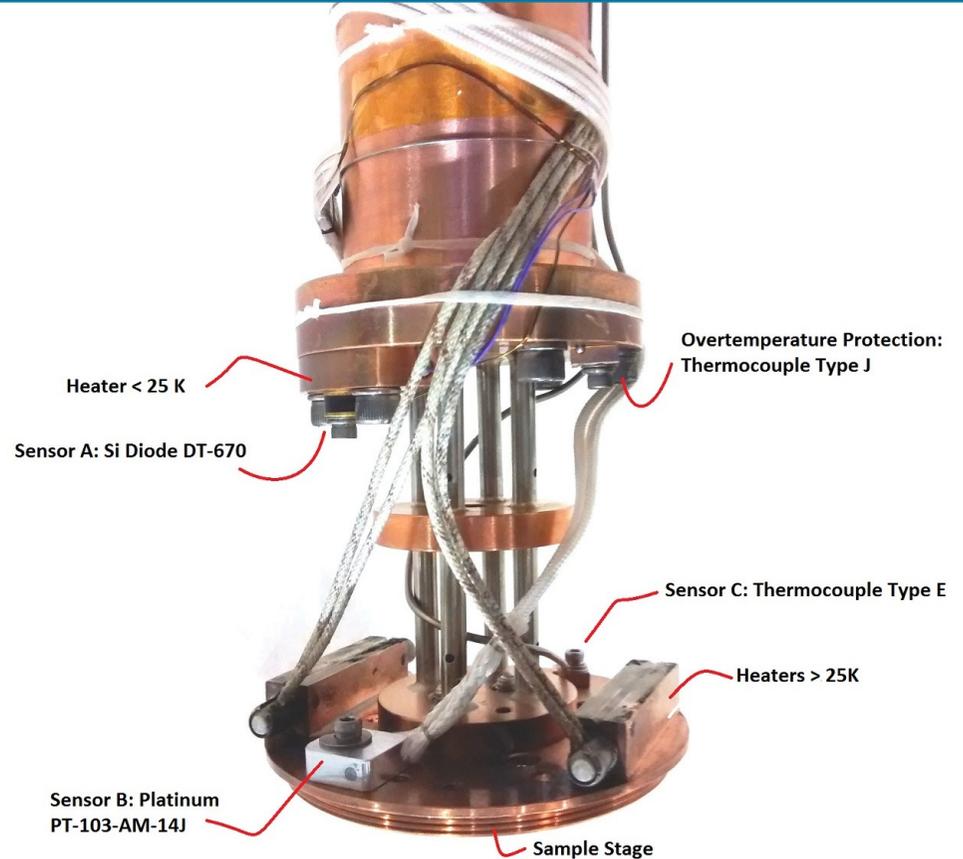
# OVERTEMP PROTECTION: SOLUTION

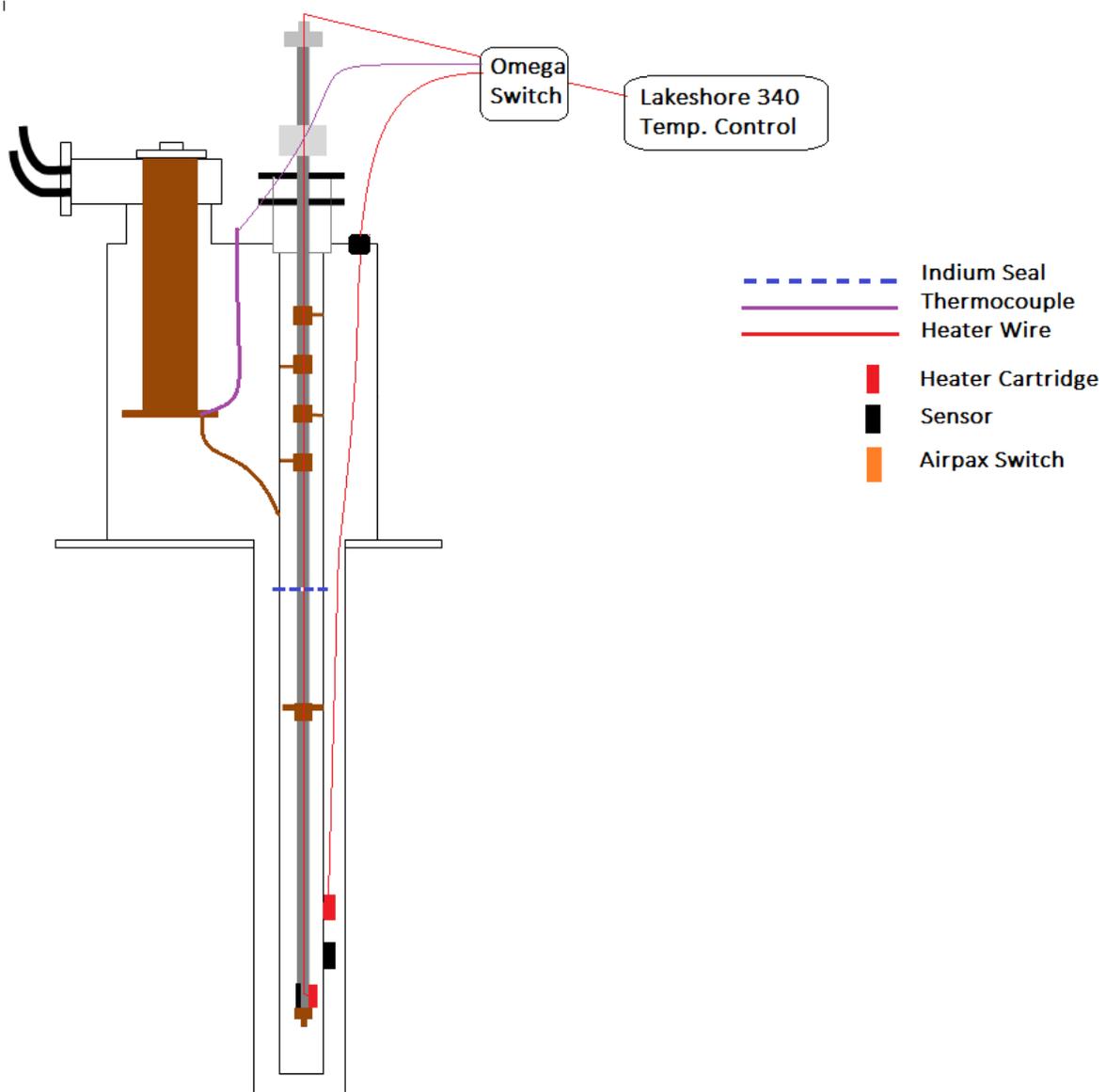
- Airpax subminiature thermostat switch:
  - Fixed setpoint, Normally closed, opens the circuit when temperature is exceeded, closes the circuit when it cools below the close setpoint
  - Soldered into the heater line inside the vacuum space
  - Bolted/stycast to the sample stage or sample well
  - Cannot be changed without warming and breaking vacuum first
  - Cannot be bypassed in normal operation
  - Does not require additional wiring or power, nothing for users to remember
  - We already use these on the Leybold and ARS cold heads, very reliable
  - Might be difficult to install in limited space inside the top-loaders

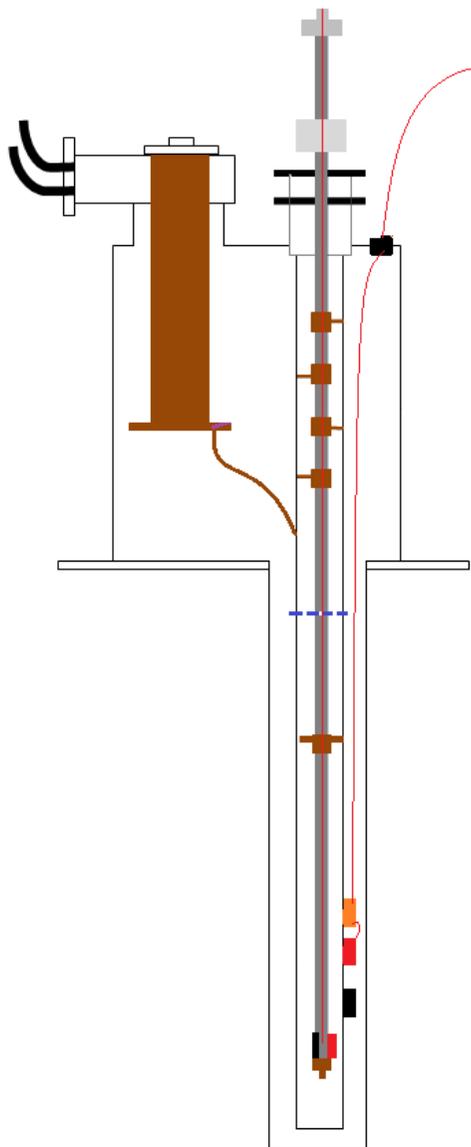


# TLCCR SAMPLE WELL

# BLCCR SAMPLE STAGE

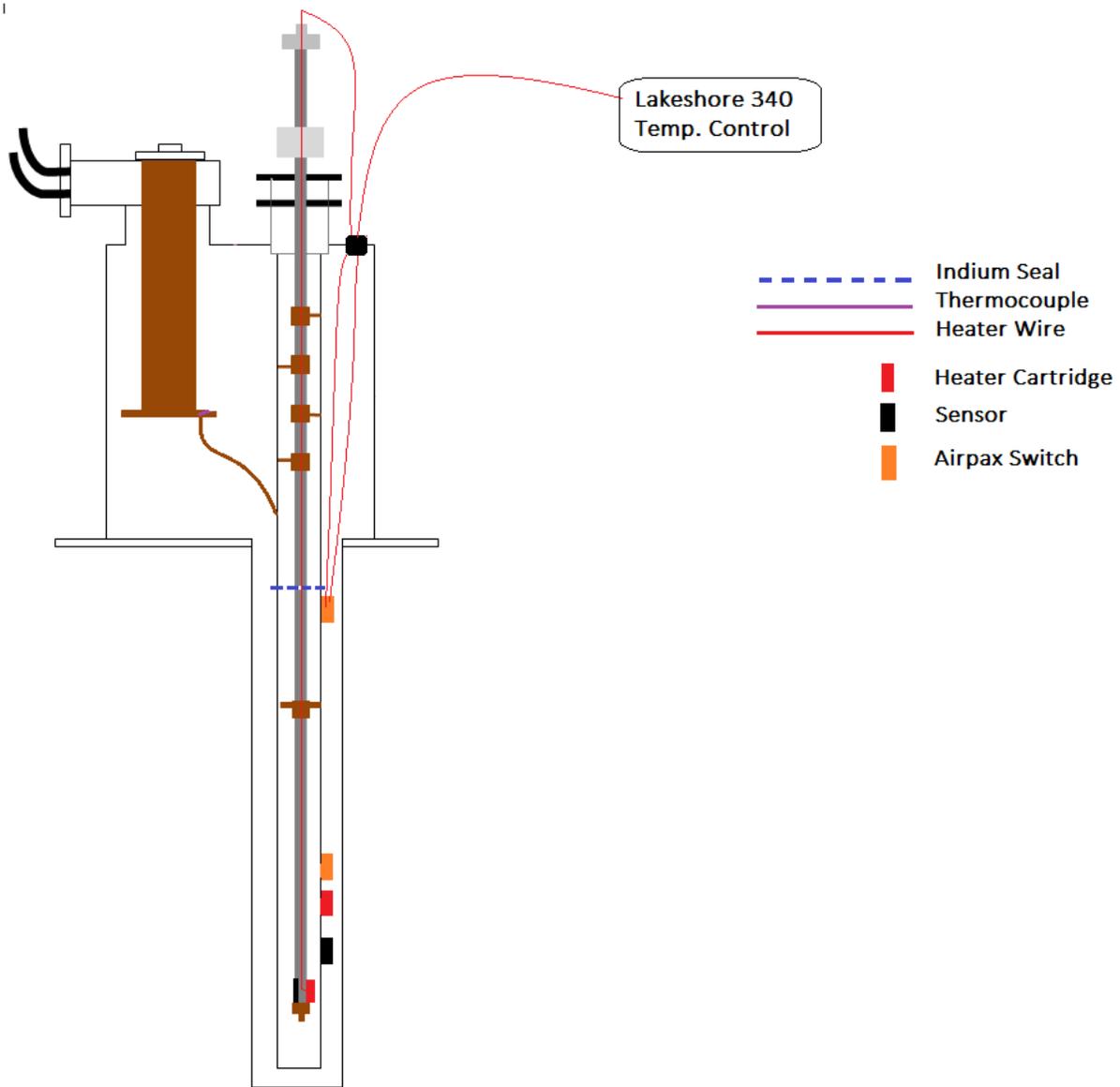






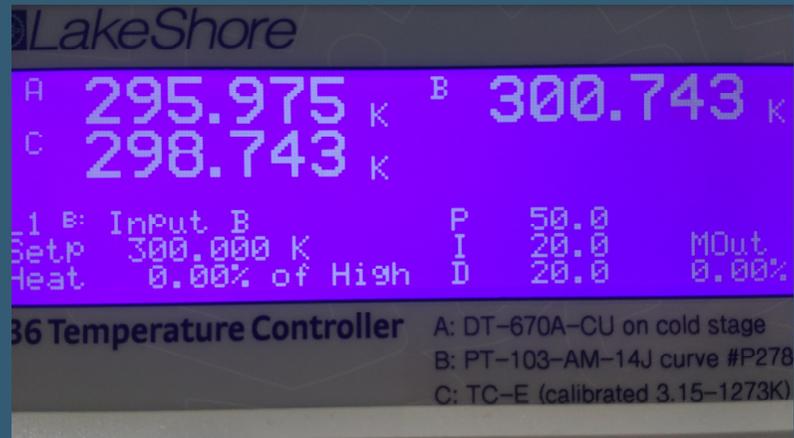
Lakeshore 340  
Temp. Control

- Indium Seal
- Thermocouple
- Heater Wire
- Heater Cartridge
- Sensor
- Airpax Switch



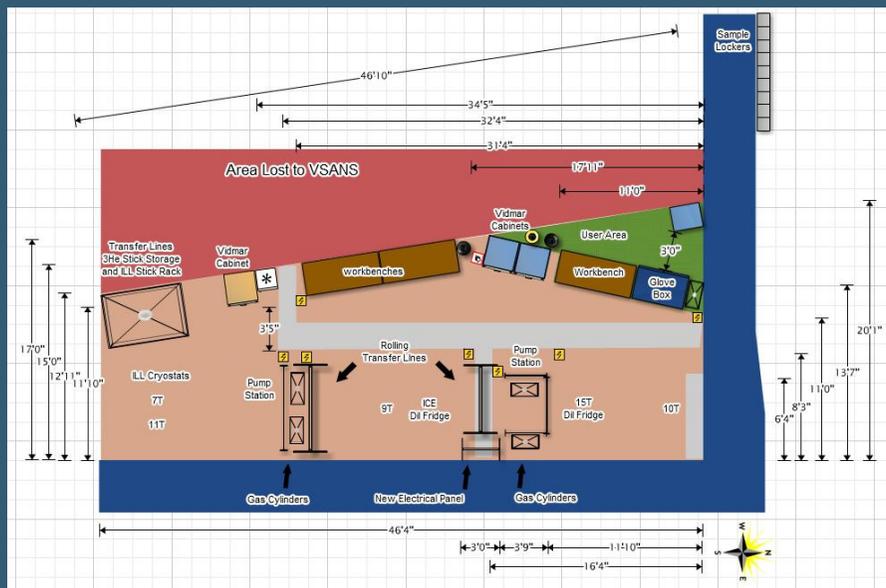
# SENSORS & PID TUNING

- Liquid nitrogen test all sensors
- Replace or calibrate as needed
- Add drop-down sensor option to all BLCCR
- Tune PIDs after cold head displacer service and sensors check
- Lakeshore controllers



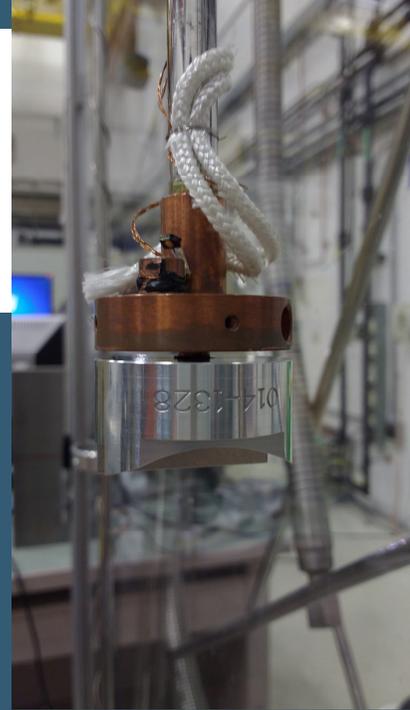
# PROJECTS

- User stations:
  - Sample mount accessories
  - Clean old sample cans
  - Barcoding for sample tracking
- Floors
  - Pump stations at SE areas
  - Everything on wheels
- Development
  - Multi-sample holder for Reflectometry CCR
  - Offline testing setup for Colin Heikes
  - Duplicate tails for CCRs w/ magnets – Alan Ye
  - HFBS remote control of High/Low T modes – Alan Ye



# READY FOR STARTUP

- Heat shields and sample stages
- Sample stick maintenance
- Toolboxes and allen drivers
- Comms connections
- Carts, clamps, and wheels



# 13 WEEKS REMAINING IN SHUTDOWN

- Priority 1: TLCCRs
  - 3 Days Per: 4 Weeks Total
  - Sample Sticks: 1 Week
  - Alan Ye is helping
- Priority 2: ARS BLCCRs
  - 2 Days Per: 3 Weeks Total
- Priority 2: Janis BLCCRs
  - 2 Days Per: 4 Weeks Total
- SE Training School: 1 Week
- Vacation Time: 2 Weeks



- Priority ...Other?
  - User Areas and Accessories: 1 Week
  - Floors and Equipment moves: 1wk?
  - ...