General timeline and summary:

June 5, 2025

- Two air cooling flows, one cooling tank buffer pressure, and nitrogen purge flow dropped to zero.
 - All four sensors are measured using NI-9219 ADC modules in an expansion cRIO chassis (sbRIO controller can't use C-modules, hence the need for the expansion chassis).
 - In the past, losing the gas system sensors meant that the expansion chassis failed and needs to be swapped with spare.
- Hall was in controlled access for Torus investigation, so Chris Dilks and I went down to the hall and expansion chassis and its modules.
- Missing configuration of expansion chassis prevented restoration
 - At this point in time, expansion chassis only had a local cross-over cable connection to the main sbRIO so nothing could be done without physical access to the chassis
- Ran out of time for in-hall work as hall went from controlled access to beam permit after Torus work finished

June 6, 2025

- Hall was put in controlled access again for Torus work in the morning
- Expansion chassis for RICH S1 connected to the network to be able to remotely configure it over the network
- Restored gas system sensor read back, but temperature and humidity sensor read back decided to stop because of an internal power supply failure in the sbRIO controller.
 Solution is to swap sbRIO controller with spare
- Hall had returned to beam permit because Torus work finished, so again swap was postponed until next maintenance day

June 11, 2025

- Hall in controlled access for accelerator maintenance day
- Accessed hall and swapped sbRIO controller with spare
 - All S1 interlocks work at this point
- Verified interlock system disables HV and LV power supply upon an interlock
 - o Used multimeter to verify interlock signal output at chassis
 - Used EPICS power supply interface to confirm trip shown there
 - All interlocks able to be reset
- Recompiled and deployed LabVIEW program to controller as start up application
 - Allow system to automatically boot and run program upon a power cycle

Network info for RICH S1 hardware interlock intrumentation Main controller (T & H reading, EPICS comms, interlocking) hostname: dsgsbrio3 IP: 129.57.161.36 LabVIEW version: 2024 Q3

Expansion controller (air flows, air pressure, nitrogen flow) hostname: rich2exp IP: 129.57.161.35

The LabVIEW running for S1 in the hall is at the GitHub below. <u>https://github.com/JeffersonLab/dsg-labview/tree/master/Hall_B/RICH-II%20hardware%20interlocks</u>

The program is also on the DSG Slow Controls O Drive at the path below. O:\DSG_Slow_Controls\RICH-Hardware-Interlock-System\RICH-II\RICH-II hardware interlocks -June2025 - spare swap