Hall B RICH Cooling System Tests

Date: October 14, 2019
Time: 9:00AM – 10:00AM

Attendees: Aaron Brown, Peter Bonneau, Pablo Campero, Brian Eng, Tyler Lemon, Vincenzo Lucherini, Marco Mirazita, Sandro Tomassini

1. Overview of compressors' status and timeline
    - 1.1. Compressor naming convention:
        - 1.1.1. Compressor 1 – compressor used in previous experimental run who recently underwent routine maintenance.
        - 1.1.2. Compressor 2 – compressor previously used in EEL during RICH assembly and was left unpowered in Hall B.
    - 1.2. October 7, 2019
        - 1.2.1. Compressor 1 powered to allow RICH electronics to be powered.
        - 1.2.2. Noted that buffer tank pressure was lower than normal and not showing saw-tooth pattern of compressor's on-off cycle.
    - 1.3. October 9, 2019
        - 1.3.1. Power transferred to Compressor 2.
        - 1.3.2. Leak found and repaired on buffer tank supply hose.
        - 1.3.3. Compressor 2 behaved as expected, showing saw-tooth pattern of compressor's on-off cycle when left running for ~24 hours.
    - 1.4. October 10, 2019
        - 1.4.1. Power transferred back to Compressor 1.
        - 1.4.2. After a few hours, noted that pressure in buffer tank was steadily decreasing and holding constant at ~80 psi.
        - 1.4.3. During further investigation, heard squealing sound coming from compressor; hit emergency stop button to shut down compressor.
        - 1.4.4. Cooling system left in off and depressurized state.

2. Sandro Tomassini and Dario Orecchini will be at JLab from October 22 to October 31, 2019 for cooling tests.

3. Plan for cooling test
    - 3.1. Goal of tests is to keep RICH FPGA temperatures under ~75 °C.
    - 3.2. Ideal total airflow would be < 600 slm.
        - 3.2.1. In theory, 600 slm for one RICH sector would allow two RICH sectors to be cooled by one compressor, with second acting as backup.
    - 3.3. Compressor settings will also be optimized to limit time compressor is running while still providing enough flow to RICH.

4. Test procedure
    - 4.1. Turn RICH on with 900 slm total airflow (Airflow 1 (AF1) at 500 slm and Airflow 2 (AF2) at 400 slm).
        - 4.1.1. Settings previously used in experimental run to run RICH.
    - 4.2. Change AF1 to 400 slm and AF2 to 500 slm (900 slm total).
        - 4.2.1. If interlock trips, stop tests. 900 slm (AF1 = 500 slm, AF2 = 400 slm) must be used for RICH operations.
    - 4.3. Adjust AF1 to 400 slm and AF2 to 400 slm; wait for steady state or interlock.
    - 4.4. If no interlock, decrease total airflow in 100 slm steps, waiting for steady state or interlock between changes.
    - 4.5. Settings before test with flowrates where interlocks tripped will be used during RICH operations.
        - 4.5.1. Example: if interlock trips with AF1 = 300 slm and AF2 = 300 slm, settings used for RICH operation will be AF1 = 350 slm and AF2 = 350 slm.