

## **Hall D Operations Resumption Plan**

Hall D may be returning to a state where it will be possible to take beam and data for the GlueX experiment. The BDX parasitic experiment will also be restored to full operation.

This plan is the reverse of Mark Dalton's plan with which Hall D was put into an off-line status for the Covid 19 crisis, commensurate with Jlab's MedCon 6 status. It is a three day plan.

### **Current Status**

Hall D is in Restricted Access, and the CANS access doors are magnetically locked. The Solenoid superconductive magnet is "parked" at about 4 degrees Kelvin, and is ready to be powered again. There are segments of beam pipe which may be at atmospheric pressure, and will need to be pumped down. The liquid hydrogen target is warmed up and empty of hydrogen; it will need to be cooled down and refilled. All detector electronic systems and the cooling equipment for them are turned off.

### **Access and PPE requirements**

Commensurate with standing instructions, Hall D will be returned to full on line operation while all personnel maintaining Social Distancing of at least six feet. Only one person is allowed in the Hall personnel labyrinth at a time. A hospital type face mask (or approved respirator, if the individual is trained and qualified to use one) shall be worn at all times. Disposable rubber gloves shall be worn at all times. Other PPE may be required, depending on the task being performed, such as (but not limited to) safety glasses. No safety rules have been rescinded. If there appears to be any conflict, please discuss it with the Work Coordinator.

One goal of this plan is to limit each worker's exposure to other people and the transmission of the Covid 19 virus. This is accomplished both with physical (Social) Distancing and time separation. The maximum number of personnel allowed in the Hall or the Tagger Vault simultaneously is 5, with the caveat that they must be physically separated by a distance of at least 6 feet at all times. Permission for deviating from the six foot rule must be obtained in advance of the division Associate Coordinator, Rolf Ent.

### **General Timing of work in the Hall**

The Work Coordinator will be on site, and available for discussion.

The Mechanical Checklist from the Hot Checkout should be performed, and all vacuums and chillers/cooling fans will be restored to operation. Beam line vacuums will be restored. The Work Coordinator will direct traffic in the Hall and Vault, and act as the "Gate Keeper" of the activities and Hot Checkout checklists.

After the cooling equipment is restored to operation, and all vacuum pumps are started, responsible individuals will start to turn on electronics, and other systems as needed. In all cases, written procedures for the restoration of systems shall be followed, any deviation from this must be approved in advance by the Hall D Engineer.

Finally, after all vacuums are re-established, and all equipment is back on and the hydrogen target has been refilled, the thin vacuum window hand guards can be removed, and beam line vacuum valve can be returned to MCC. The Work Coordinator will make the final Logbook entry that run preparations are complete, and attach initialed/signed copies of the Hot Checkout checklists.

### **First Day:**

#### **Mechanical**

1. BDX tent: Turn on Bertha, air conditioner and crate power. – Mark Steven
2. TEDF Cleanroom: The lights may be turned back on, and work may be resumed as needed, as long as Social Distancing can be maintained, and face masks and rubber gloves are worn.
3. ComCal: Restore N2 purge to run value. Restore and reactivate chiller – Josh Foyles/Bobby Bunton
4. Dirc:
  - A. Check N2 purge rate to Bar Boxes – Keith Blackburn/Chris Allen
  - B. Reduce Optical Box purge to run values. Restart the DIRC water cart. Refill both Optical Boxes with purified water, adding new water to the system as required. Follow written procedure. Obtain water samples as directed. Get RadCon to release all water samples from the Hall. – Keith Blackburn/Chris Allen
  - C. Turn on DIRC Optical Box blowers (before the PMT electronics are turned on). – Nick Sandoval
5. Turn on Tagger NMR probe electronics – Tim Whitlatch or Mark Stevens
6. Detector Gas Supply argon/CO2(service as needed) – Josh Foyles/Bobby Bunton
7. Detector apparatus cooling (follow checklist(s))
  - A. Turn on Microscope fan – Josh Foyles/Bobby Bunton
  - B. Bcal readout N2 purge – increase to run value – Josh Foyles/Bobby Bunton
  - C. CDC blower – turn back on – Josh Foyles/Bobby Bunton
  - D. BCAL chillers (refill circuits and start chillers) Josh Foyles/Bobby Bunton
  - E. FDC chiller – turn back on and check proper operation – Josh Foyles/Bobby Bunton
8. Beamline Vacuum
  - A. Turn on or verify normal operation of Goniometer pump per written procedure – Keith Blackburn/Chris Allen
  - B. Turn on or verify normal operation of Tagger pump per written procedure – Keith Blackburn/Chris Allen

- C. Turn on or verify normal operation of 10" beam pipe per written procedure (between Tagger Vault and Collimeter Cave) – Keith Blackburn/Chris Allen
- D. Turn on or verify normal operation of Collimeter Cave vacuum pumps (per procedure) – Keith Blackburn/Chris Allen
- E. Turn on or verify normal operation of Upstream Platform beamline vacuum pumps (per written procedure) – Keith Blackburn/Chris Allen
- F. Fcal (downstream) Platform beam pipe – reconnect pump and pump down per written procedure – Keith Blackburn/Chris Allen

### **Second day**

1. Turn on and ramp up Pair Spec magnet power supply, ramp to full current, soak for 5 minutes per procedure, then ramp to zero amps – Scot Spiegel
2. Turn on and ramp up Sweeper magnet power supply, ramp to full current, soak for 5 minutes per procedure, then ramp to zero amps – Scot Spiegel
3. Restore alcohol bubblers, increase FDC and CDC gas flow to run values, check gas log and maintenance log for proper entries – Scot Spiegel
4. Turn on and ramp up Solenoid Power Supply to 100 amps at \_\_\_ amps/sec ramp rate, soak for 5 minutes, then ramp to zero amps – Scot Spiegel
5. If desired, turn on Target Pulse Tube Refrigerator – Tim Whitlatch/Chris Keith or their designees

### **Third day**

1. Fill Target – Chris Keith or his designee
2. Contact Chris Keith – ensure Target readiness – Mark Stevens or Tim Whitlatch
3. Begin recording PXI data – Tim Whitlatch or Mark Stevens
4. Check Hall environmental settings (especially temperature) – Tim Whitlatch or Mark Stevens

### **Electrical**

1. Ensure all run/data acquisition computers are running properly
2. Turn on all necessary crates
3. Extend retracted devices as required
4. Ensure the following items are in their correct run positions:
  - A. Radiators
  - B. Profiler
  - C. Collimator
  - D. TPOL converter extended
  - E. P.S. converter extended (if needed)
  - F. ComCal in correct position, electronics running if needed
  - G. TAC in position, electronics running if needed
  - H. Detector electronics:

- a. BCAL: LV, Bias
- b. CDC: LV, HV
- c. DIRC: HV, LV
- d. FCAL: HV, L V – Nick Sandoval
- e. CCAL
- f. FDC: HV, LV – Lubomir
- g. GEM/TRD: HV, LV – Lubomir
- h. PS, PSC
- i. TAGH – Nick Sandoval
- j. TAGM – Nick Sandoval
- k. TOF: HV, LV – Lubomir
- l. ST: Bia, LV – Lubomir
- m. Beam line Voltages: Active, Target, TAC, halo
- n. TPOL
- o. Verify still on/running:
  - 1. All computers, switches, control modules
  - 2. Accelerator crates (US1-1, US1-2)
- p. Turn on Crate power:
  - 1. DAQ crates: VXS, VME Hall D
  - 2. DAQ crates, VXS, VME Tagger Building/Vault
  - 3. Record status in log book.