



THOMAS JEFFERSON NATIONAL ACCELERATOR FACILITY

12000 Jefferson Avenue
Newport News, VA 23606

HALL D PROCEDURE NO.:
D00000-18-04-P002 Rev -

TITLE: Hall D MEDCON5 Physics Resumption Plan DATE: 05/13/2020

BY: M. Stevens

APP: T. Whitlatch

CHK: S. Spiegel

APP: _____

Original Application:

REV.	DESCRIPTION	BY	CHK.	APP.	APP.	DATE



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Hall D Operations Resumption Plan

Hall D will be returning to a state where it will be possible to take beam and data for the GlueX experiment for a period of six weeks. In addition, The BDX parasitic experiment may also be restored to full operation. The date of resumption is floating and will be announced by JLAB management.

This plan is the reverse of the shut-down plan with which Hall D was put into an off-line status for the Covid 19 crisis, commensurate with Jlab's MedCon 6 status. This plan assumes we will be in MEDCON5 status for the duration of work covered herein and the personnel working on the equipment will be minimized. The Mechanical Group will be split into 2 teams of 3 people to accomplish this. Only one team will be on-site at any given time.

This plan will include portions of the following Hall D Procedures:

Hall D Procedure D00000-01-08-P003, Hall D DIRC Mirror Box Removal and Installation

Hall D Procedure D00000-12-02-P001, Hall D Bcal/Comcal/FDC Chiller Fill/Start Procedure

Hall D Procedure D00000-16-11-P001 Rev D, Hall D Solenoid Magnet Power Supply Internal Interlock Checklist

Hall D Procedure D00000-15-00-P004 Rev, Hall D Pair Spectrometer Magnet Power Supply Maintenance Turn-on Checklist

Hall D Procedure D00000-04-00-P002 Rev, Hall D Sweep Magnet Power Supply Turn on Checklist

Current Status Before Resumption

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. This procedure allows the operations of Hall D equipment to be brought to full operations under MEDCON5 status of JLAB.

Access and PPE requirements

Commensurate with standing instructions, Hall D equipment will be returned to full on line operation while all personnel maintain Social Distancing of at least six feet. There is no task in this plan which requires deviation from the six-foot minimum Social Distance Rule. Only one person is allowed in the Hall entrance 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



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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 simultaneously is 5, with the caveat that they must be physically separated by a distance of at least 6 feet at all times. The maximum number of personnel allowed in the Tagger Vault simultaneously is 3, 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 task from the Physics division Associate Director. Anticipate additional duties, such as the disinfection of surfaces, being required. The maximum number of techs at work at any time will be 3 to avoid overcrowding in the Counting House. This plan assumes there will only be 6-7 hours of productive work per day.

General Timing of work in the Hall

The Work Coordinator (or Alternate Work Coordinator) will be on site, and available for discussion.

The first day back at Jlab will be mainly an "administrative day". After all applicable documentation is reviewed, signed and discussed, work on the equipment may resume.

After the mechanical items on this procedure are performed, the Mechanical Checklist from the Hot Checkout should be reviewed and performed (as applicable), and all vacuums and chillers/cooling fans will be restored to operation. The Work Coordinator will direct traffic in the Hall and Vault, and act as the "Gate Keeper" of the activities and the Hot Checkout checklists.

After the cooling equipment is restored to operation, and all vacuum pumps are started (and the approval of the Work Coordinator is obtained), 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 or responsible Physicist.

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 control can be returned to MCC. This will be accomplished with the "HallD Acceptance Checklist" from the Hot Checkout system. The Work Coordinator will make the final HDLog Logbook entry that run preparations are complete, and attach initialed/signed copies of the Hot Checkout checklists.

First Day:

Administrative Day

1. You will be directed to report for work with a phone call from the Work Coordinator or the Hall D engineer. Do not come in to Jlab until you receive that call. Wearing your face mask and disposable gloves, you can anticipate reporting first to a location where daily health screening will be performed.



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2. Next, you will read and sign the “MEDCON5 Operations OSP” if not already completed remotely.
3. You should use the rest of this day catching up on paperwork and training (such as Respirator Fit Test), and ensuring that parts and procedures are on hand or on order to support operations.

Second Day:

Mechanical:

1. BDX tent (if directed by responsible Physicist): Turn on Bertha, air conditioner and crate power. – Mark Stevens, 1 hour
2. TEDF Cleanroom: The lights may be turned back on, and work may be resumed as needed, as long as the OSP is reviewed and Social Distancing can be maintained, and face masks and rubber gloves are worn. Mark Stevens, 1 hour.
3. ComCal: Restore N2 purge to run value. Restore and reactivate chiller – Josh Foyles/Bobby Bunton, 4 hours. (refer to Hall D Procedure above)

Third day:

4. Dirc:
 - A. Check N2 purge rate to Bar Boxes – Keith Blackburn/Chris Allen, 1 hour
 - 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, 6 hours

Fourth Day:

- C. Turn on DIRC Optical Box blowers (before the PMT electronics are turned on). – Nick Sandoval, 1 hour
5. Turn on Tagger NMR probe electronics – Tim Whitlatch or Mark Stevens, 0.5 hour
6. Detector Gas Supply argon/CO2(service as needed) – Josh Foyles/Bobby Bunton, 2 hours
7. Detector apparatus cooling (follow checklist(s))
 - A. Turn on Microscope fan – Josh Foyles/Bobby Bunton, 1 hour
 - B. Bcal readout N2 purge – increase to run value – Josh Foyles/Bobby Bunton, 1 hour
 - C. CDC blower – turn back on – Josh Foyles/Bobby Bunton, 1 hour
8. BCAL chillers (refill circuits and start chillers) Josh Foyles/Bobby Bunton (refer to Hall D Procedure above), 5 hours

Fifth day

9. BCAL chillers (continued)(refill circuits and start chillers) Josh Foyles/Chris Allen (refer to Hall D Procedure above), 5 hours
10. FDC chiller – turn back on and check proper operation – Josh Foyles/Bobby Bunton (refer to Hall D Procedure above), 1 hour
11. Beamline Vacuum
 - A. Turn on or verify normal operation of Goniometer pump per written procedure – Keith Blackburn/Bobby Bunton, 1 hour
 - B. Turn on or verify normal operation of Tagger vacuum pump per written procedure – Keith Blackburn/ Bobby Bunton, 1 hour
 - C. Turn on or verify normal operation of 10” beam pipe per written procedure (between Tagger Vault and Collimator Cave) – Keith Blackburn/ Bobby Bunton, 1 hour
 - D. Turn on or verify normal operation of Collimator Cave vacuum pumps (per procedure) – Keith Blackburn/Chris Allen, 1 hour
 - E. Turn on or verify normal operation of Upstream Platform beamline vacuum pumps (per written procedure) – Keith Blackburn/Chris Allen, 1 hour
 - F. Fcal (downstream) Platform beam pipe – reconnect pump and pump down per written procedure – Keith Blackburn/Chris Allen, 1 hour

Sixth day:

1. Accomplish the Hall D Solenoid Magnet Interlock Checklist, Scot Spiegel/Mark Stevens, 4 hours
2. Accomplish the Hall D Pair Spectrometer Magnet Power Supply Maintenance Turn-on Checklist Scot Spiegel/Mark Stevens, 2 hours
3. Accomplish the Hall D Sweep Magnet Power Supply Turn on Checklist Scot Spiegel/Mark Stevens, 2 hours

Seventh Day:

4. 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, 1 hour
5. 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, 1 hour

6. Restore alcohol bubblers, increase FDC and CDC gas flow to run values, check gas log and maintenance log for proper entries – Scot Spiegel, 1 hour
7. Turn on and ramp up Solenoid Power Supply to 800 amps at ___ amps/sec ramp rate, soak for 5 minutes, then ramp to zero amps – Scot Spiegel, 8 hours (Note-this task may be split over two days, and paused or “auto-piloted” overnight, with permission.)
8. If desired, turn on Target Pulse Tube Refrigerator – Tim Whitlatch/Chris Keith or their designees

The Hot Checkout Checklists will be signed off by the Hall D Work Coordinator, subsequent to the above being accomplished.

Eighth day:

1. Fill Target – Chris Keith or his designee, 4 hours
2. Contact Chris Keith – ensure Target readiness – Mark Stevens or Tim Whitlatch, 1 hour

In addition to the above, this day can be used to “catch up” any preceding task that takes longer than my estimate.

Ninth through tenth day

3. Begin recording PXI data – Tim Whitlatch or Mark Stevens
4. Check Hall environmental settings (especially temperature) – Tim Whitlatch or Mark Stevens

Electrical – shall only be accomplished after all cooling systems are operational

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:



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- a. BCAL: LV, Bias
- b. CDC: LV, HV
- c. DIRC: HV, LV
- d. FCAL: HV, LV – 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.