

# Cryo Target Pre Beam Checklist

Last revised 03-28-2017    Date \_\_\_\_\_ time \_\_\_\_\_

**This checklist will be performed after every restricted access to Hall A that maintenance is performed**

Person(s) Completing Checklist \_\_\_\_\_

## Left-HRS

### *Spectrometers*

- \_\_\_ Current L-HRS angle \_\_\_\_\_ (not to be used for calculations)
- \_\_\_ Check spectrometer for obstructions to movement
- \_\_\_ Check Intergen bottles for correct pressure
- \_\_\_ Ensure that Intergen alarm switch is in the normal position and the green light on the front panel is on
- \_\_\_ Ensure that 14-degree stop pin is installed (if used)
- \_\_\_ Ensure that outer limit stop is installed (if used)
- \_\_\_ Minimum/Maximum angles for spectrometer from \_\_\_\_\_ to \_\_\_\_\_ degrees.

### *Vacuum*

- \_\_\_ Turbo on at turbo controller in rack # 1H71B01
- \_\_\_ Pump valves open at valve controller in rack # 1H71B01 channel #2
- \_\_\_ Convectron gages read "0" millitorr rack # 1H71B01
- \_\_\_ Cold cathode gauge in rack # 1H71B01  $< 5 \times 10^{-5}$
- \_\_\_ Actual cold cathode reading \_\_\_\_\_

**\*\*PLEASE MAKE SURE ALL TEMP. READOUTS ARE IN FAHRENHEIT AND NOT CELSIUS\*\***

- \_\_\_ Ensure that Q2 lead heaters in rack 1H71B07 are on and operating and at least 40° F  
Actual lead temperatures      left\_\_\_\_      right\_\_\_\_
- \_\_\_ Ensure that Q3 lead heaters in rack 1H71B08 are on and operating and at least 40° F  
Actual lead temperatures      left\_\_\_\_      right\_\_\_\_
- \_\_\_ Ensure that Dipole lead heaters in rack 1H71Q are on and operating and at least 40° F  
Actual lead temperatures      left\_\_\_\_      right\_\_\_\_
- \_\_\_ Bogie power is ON \_\_\_ off \_\_\_

## **Power Supplies (L-HRS)**

**\*\*\*MAKE SURE LCW IS ON TO ALL POWER SUPPLIES BEFORE POWERING ON\*\*\***

### **Q1:**

Visual inspection of main current leads, dump resistor, and lead flags (for condition, visual shorts, etc.)

Unlock power disconnect switch and turn on AC power

Visually check power supply front panel for faults

When all faults have been cleared, Ensure that power supply is in remote control (light ON= remote)

### **Q2:**

Visual inspection of main current leads, dump resistor, and lead flags (for condition, visual shorts, etc.)

Ensure that all doors and panels are closed and secured

Unlock power disconnect switch and turn on AC power

Turn on both sets of three pole breakers located on power supply

Visually check power supply for faults

When all faults have been cleared, lift lever on lower right side of supply

Ensure that power supply is in remote control

### **Q3:**

Visual inspection of main current leads, dump resistor, and lead flags (for condition, visual shorts, etc.)

Ensure that all doors and panels are closed and secured

Unlock power disconnect switch and turn on AC power

Turn on both sets of three pole breakers located on power supply

Visually check power supply for faults

When all faults have been cleared, lift lever on lower right side of supply

Ensure that power supply is in remote control

### **Dipole:**

Visual inspection of main current leads, dump resistor, and lead flags (for condition, visual shorts, etc.)

Unlock power disconnect switch and turn on AC power

Turn on power lever on right upper side of supply

Visually check power supply for faults on supply and at rack #

When all faults have been cleared, Ensure that power supply is in remote control

Ensure Kepco power supply is on in rack # 1H71B06

Check position of polarity switch in rack # 1H71B06 positive\_\_\_ negative\_\_\_

**NMR gradient compensation for proper polarity** positive\_\_\_ negative\_\_\_ (Dipole balcony)

Ensure that the Q3 insulating vacuum pump is on and has sufficient oil

Ensure the Q3 automatic valve is closed and open and it's the Convectron gage reads 0

Ensure that the Q2 insulating vacuum pump/ blower is on and has sufficient oil

Ensure the Q2 automatic valve is operational and open and it's the Convectron gage reads 0

Ensure that spectrometer turbo backing pump is on, has sufficient oil and that the automatic valve is operational

## Right-HRS

### *Spectrometers*

- \_\_\_ Current R-HRS angle \_\_\_\_\_ (not to be used for calculations)
- \_\_\_ Check spectrometer for obstructions to movement
- \_\_\_ Check Intergen bottles for correct pressure
- \_\_\_ Ensure that Intergen alarm switch is in the normal position and the green light is on on the front panel
- \_\_\_ Ensure that 14-degree stop pin is installed
- \_\_\_ Ensure that outer limit stop is installed (if used)
- \_\_\_ Minimum/maximum angles for spectrometer \_\_\_\_\_ to \_\_\_\_\_ degrees.

### *Vacuum*

- \_\_\_ Turbo on at turbo controller in rack # 1H72B01
- \_\_\_ Pump valves open at valve controller in rack # 1H72B01 channel #2
- \_\_\_ Convectron gages read "0" millitorr in rack # 1H72B01
- \_\_\_ Cold cathode gauge in rack # 1H72B01 <  $5 \times 10^{-5}$
- \_\_\_ Actual cold cathode reading \_\_\_\_\_

**\*\*PLEASE MAKE SURE ALL TEMP. READOUTS ARE IN FAHRENHEIT AND NOT CELSIUS\*\***

- \_\_\_ Ensure that Q2 lead heaters in rack 1H72B08 are on and operating and at least 40° F  
Actual lead temperatures      left \_\_\_\_\_      right \_\_\_\_\_
- \_\_\_ Ensure that Q3 lead heaters in rack 1H72B07 are on and operating and at least 40° F  
Actual lead temperatures      left \_\_\_\_\_      right \_\_\_\_\_
- \_\_\_ Ensure that Dipole lead heaters in rack 1H72Q are on and operating and at least 40° F  
Actual lead temperatures      left \_\_\_\_\_      right \_\_\_\_\_
- \_\_\_ Bogie power is ON \_\_\_ Off \_\_\_

## **Power Supplies (R-HRS)**

**\*\*\*MAKE SURE LCW IS ON TO ALL POWER SUPPLIES BEFORE POWERING ON\*\*\***

### **Q1:**

**\_\_\_ Visual inspection of main current leads, dump resistor, and lead flags (for condition, visual shorts, etc.)**

- \_\_\_ Unlock power disconnect switch and turn on AC power
- \_\_\_ Visually check power supply front panel for faults
- \_\_\_ When all faults have been cleared, Ensure that power supply is in remote control (light ON= remote)

### **Q2:**

**\_\_\_ Visual inspection of main current leads, dump resistor, and lead flags (for condition, visual shorts, etc.)**

- \_\_\_ Ensure that all doors and panels are closed and secured
- \_\_\_ Unlock power disconnect switch and turn on AC power
- \_\_\_ Turn on both sets of three pole breakers located on power supply
- \_\_\_ Visually check power supply for faults
- \_\_\_ When all faults have been cleared, lift lever on lower right side of supply.
- \_\_\_ Ensure that power supply is in remote control

### **Q3:**

**\_\_\_ Visual inspection of main current leads, dump resistor, and lead flags (for condition, visual shorts, etc.)**

- \_\_\_ Ensure that all doors and panels are closed and secured
- \_\_\_ Unlock power disconnect switch and turn on AC power
- \_\_\_ Turn on both sets of three pole breakers located on power supply
- \_\_\_ Visually check power supply for faults.
- \_\_\_ When all faults have been cleared, lift lever on lower right side of supply.
- \_\_\_ Ensure that power supply is in remote control

### **Dipole:**

**\_\_\_ Visual inspection of main current leads, dump resistor, and lead flags (for condition, visual shorts, etc.)**

- \_\_\_ Unlock power disconnect switch and turn on AC power
- \_\_\_ Turn on power lever on right upper side of supply.
- \_\_\_ Visually, check power supply for faults on supply and at rack #OD172Q
- \_\_\_ When all faults have been cleared, Ensure that power supply is in remote control
- \_\_\_ Ensure Kepco power supply is on in rack # 1H72B06
- \_\_\_ Check position of polarity switch in rack # 1H72B06 positive\_\_\_ negative\_\_\_
- \_\_\_ **NMR gradient compensation for proper polarity** positive\_\_\_ negative\_\_\_ (Dipole balcony)
- \_\_\_ Ensure that the Dipole automatic valve is operational and open, that the Convector gage reads 0 and that the backing pump is on, has sufficient oil
- \_\_\_ Ensure that the Q3 automatic valve is operational and open, that the Convector gage reads 0 and that the backing pump is on, and has sufficient oil
  
- \_\_\_ Ensure that the Q2 insulating vacuum pump is on, and has sufficient oil
- \_\_\_ Ensure the Q2 automatic valve is operational and open and it's the Convector gage reads 0
  
- \_\_\_ Ensure that spectrometer turbo backing pump is on, has sufficient oil and that the automatic valve is operational

## Left-HRS (from the computer)

### *Spectrometer controls*

- \_\_\_ Bogie controls checked for operation (do not move)
- \_\_\_ Check movement of left collimator for operation at 3 positions (if used)
- \_\_\_ Check left angle camera for movement in both directions

### *Magnet controls*

#### Q1 (check at magnet and LCW lines)

- \_\_\_ Ensure LCW is on to magnet
- \_\_\_ Supply pressure \_\_\_\_\_ psi (must be >100psi)
- \_\_\_ Return pressure \_\_\_\_\_ psi (must be <50psi)

#### Q2

- \_\_\_ Q2 full of liquid (80%) actual reading from computer \_\_\_\_\_
- \_\_\_ Open lead flows on Q2 to 80 slm as read from the Hall A Tools page
- \_\_\_ Actual lead flows A \_\_\_\_\_ B \_\_\_\_\_

#### D1

- \_\_\_ Dipole full of liquid (60%) actual reading from computer \_\_\_\_\_
- \_\_\_ Open lead flows on Dipole to 80 slm as read from the Hall A Tools page
- \_\_\_ Actual lead flows A \_\_\_\_\_ B \_\_\_\_\_

#### Q3

- \_\_\_ Q3 full of liquid (80%) actual reading from computer \_\_\_\_\_
- \_\_\_ Open lead flows on Q3 to 100 slm as read from the Hall A Tools page
- \_\_\_ Actual lead flows A \_\_\_\_\_ B \_\_\_\_\_

## Right-HRS (from the computer)

### *Spectrometer controls*

- \_\_\_ Bogie controls checked for operation (do not move)
- \_\_\_ Check movement of right collimator for operation at 3 positions (if used)
- \_\_\_ check right angle camera for movement in both directions

### *Magnet controls*

#### Q1 (check at magnet and LCW lines)

- \_\_\_ Ensure LCW is on to magnet
- \_\_\_ Supply pressure \_\_\_\_\_ psi (must be >100psi)
- \_\_\_ Return pressure \_\_\_\_\_ psi (must be <50psi)

#### Q2

- \_\_\_ Q2 full of liquid (80%) actual reading from computer \_\_\_\_\_
- \_\_\_ Open lead flows on Q2 to 80 slm as read from the Hall A Tools page
- \_\_\_ Actual lead flows A \_\_\_\_\_ B \_\_\_\_\_

#### D1

- \_\_\_ Dipole full of liquid (60%) actual reading from computer \_\_\_\_\_
- \_\_\_ Open lead flows on Dipole to 80 slm as read from the Hall A Tools page
- \_\_\_ Actual lead flows A \_\_\_\_\_ B \_\_\_\_\_

#### Q3

- \_\_\_ Q3 full of liquid (80%) actual reading from computer \_\_\_\_\_
- \_\_\_ Open lead flows on Q3 to 80 slm as read from the Hall A Tools page
- \_\_\_ Actual lead flows A \_\_\_\_\_ B \_\_\_\_\_

## Controls check from the computer console

- \_\_\_ Pull up the Hall A tools page
- \_\_\_ Ensure that all of the lead flows are in the green
- \_\_\_ Ensure that all liquid levels are in the green
- \_\_\_ Ensure all magnets on L-HRS are the same \_\_\_ negative or \_\_\_ positive
- \_\_\_ Ensure all magnets on R-HRS are the same \_\_\_ negative or \_\_\_ positive
  
- \_\_\_ Using the current button open the control page to **left Q1**
- \_\_\_ Clear all faults and turn on magnet with correct polarity
- \_\_\_ Ramp magnet to **50 amps**
  
- \_\_\_ Using the current button open the control page to **left Q2**
- \_\_\_ Clear all faults and turn on magnet with correct polarity
- \_\_\_ Ramp magnet to **50 amps**
  
- \_\_\_ Using the current button open the control page to **left Q3**
- \_\_\_ Clear all faults and turn on magnet with correct polarity
- \_\_\_ Ramp magnet to **50 amps**
  
- \_\_\_ Using the current button open the control page to **left Dipole**
- \_\_\_ Clear all faults and turn on magnet with correct polarity
- \_\_\_ Ramp magnet to **50 amps**
  
- \_\_\_ Using the current button open the control page to **right Q1**
- \_\_\_ Clear all faults and turn on magnet with correct polarity
- \_\_\_ Ramp magnet to **50 amps**
  
- \_\_\_ Using the current button open the control page to **right Q2**
- \_\_\_ Clear all faults and turn on magnet with correct polarity
- \_\_\_ Ramp magnet to **50 amps**
  
- \_\_\_ Using the current button open the control page to **right Q3**
- \_\_\_ Clear all faults and turn on magnet with correct polarity
- \_\_\_ Ramp magnet to **50 amps**
  
- \_\_\_ Using the current button open the control page to **right Dipole**
- \_\_\_ Clear all faults and turn on magnet with correct polarity
- \_\_\_ Ramp magnet to **50 amps**
  
- \_\_\_ input .5 GeV for both spectrometers
- \_\_\_ Ensure that all magnets lock in for the input momentum
- \_\_\_ List magnets that do not \_\_\_\_\_

### **Target**

- \_\_\_ Windows on & functional
- \_\_\_ CCTV cameras “on” and focused
- \_\_\_ Target light “on” Control located online at HAREBOOT 6 channel 3 (hlauser)
- \_\_\_ Backing pump “on” at pump
- \_\_\_ Ensure roughing is closed
- \_\_\_ Turbo “on” at rack # 1H75B09 (at least one turbo should be on depending on target)
- \_\_\_ Turbo valve “open” at rack # 1H75B09 channel # 1 upper and/or #2 lower
- \_\_\_ Ensure target convectron gage is operational in rack # 1H75B09
- \_\_\_ Ensure target **convectron** set point is **5 torr**
- \_\_\_ Convectron “0” millitorr at rack # 1H75B09
- \_\_\_ **Cold cathode < 5x10<sup>-4</sup>** at rack # 1H75B08
- \_\_\_ Actual cold cathode reading \_\_\_\_\_

### **Exit beam tube**

- \_\_\_ **Diffuser cooler on**
- \_\_\_ **Diffuser water level ok**
- \_\_\_ Close flow valve and observe flow meter (drops to 0)
- \_\_\_ Open flow valve and observe flow meter (rises to 1 GPM) Actual GPM \_\_\_\_\_
- \_\_\_ Backing pump is “on” and operational
- \_\_\_ Valve “open” at pump
- \_\_\_ Turbo “on” at rack # 1H75B09
- \_\_\_ Convectron gage operational
- \_\_\_ **Convectron “<5” millitorr** at rack # 1H75B09
- \_\_\_ Actual convectron gage reading \_\_\_\_\_
- \_\_\_ Magnetic shielding installed (if necessary)

### **Entrance beam tube**

- \_\_\_ Ensure that beam line girder turbo and backing pump are on and running
- \_\_\_ Ensure that beam line girder turbo fan is on
- \_\_\_ Ensure backing pump has sufficient oil, valve to turbo is open and automatic valve is operational
- \_\_\_ Verify cooling water flow to the Moeller Dipole (feel water line to determine if flow is present)
- \_\_\_ Verify LCW valves to 4 Moeller Quads are open
- \_\_\_ Ensure turbo upstream of Moeller and backing pump are on and running
- \_\_\_ Ensure Moeller turbo fan is on
- \_\_\_ Ensure backing pump has sufficient oil, valve to turbo is open and automatic valve is operational
- \_\_\_ Instrument air compressor functioning normally (this can be done by observing the compressor function [located near the flame lockers] or checking to see if the Hall have compressed air near the pivot)

\_\_\_ Call MCC (x7048), get the name of the person you talked to \_\_\_\_\_ and say “I am doing the Hall A pre beam checklist, Please Ensure that the Hall A beam line valves are set to close” after they say that they are, say “I am turning the control key from **MAINTENANCE to OPERATIONAL** are you ready” after they say yes, turn key and tell them **“you have control could you please open the valves so that we can verify operability and make an e-log entry”**

\_\_\_ **Actuate the following valves; \_\_\_ VBV1C20, \_\_\_ VBV1C20A, \_\_\_ VBV1H00, \_\_\_ VBV1H00A, \_\_\_ VBV1H00B, \_\_\_ VBV1H04B & \_\_\_ VBV1H04C.**

\_\_\_ **Ensure all beam line vacuum valves are “OPEN” (visually check VBV1H04 B and C which are upstream and downstream of target chamber)**



## Hall

- \_\_\_ All interlocks in rack # 1H75B08 indicate green
- \_\_\_ Ensure that all **4 Moeller power supplies** for on and in remote
- \_\_\_ Ensure installation of Ion Chambers at Compton, Moeller, and Target Chamber
- \_\_\_ Correct LCW flow and pressure ( **$\geq 110$  psi supply and  $< 50$  psi return**)
- \_\_\_ CCTV monitors at X terminal off
- \_\_\_ Walk to entire beamline clear it of all unnecessary trash, tools and equipment; make sure all guards are on and in place
- \_\_\_ Clear the beam line balcony of unnecessary tools, equipment and trash.
- \_\_\_ Clear the pivot area both HRS links of unnecessary tools, equipment and trash.
- \_\_\_ Clear the left and right power supply balconies of unnecessary tools, equipment and trash.
- \_\_\_ Clear the left and right detector platforms of unnecessary tools, equipment and trash.
- \_\_\_ Clear the hall floor of unnecessary tools, equipment and trash
- \_\_\_ Scissor Lift and Forklift near truck ramp
- \_\_\_ Move JLG inside truck ramp
- \_\_\_ Ensure that all lifting slings and safety harnesses are correctly stored and that the storage cage is at least 90 deg from the beam dump and at least 60 ft from the target
- \_\_\_ Perform pre sweep of run safe boxes [15 totals]. (**6-along wall, 3-L-HRS, 3-R-HRS, 1-Compton area, 1-personnel p-way, 1-top truck ramp door**)
- \_\_\_ Move Left spectrometer stairs clear of lower balcony.
- \_\_\_ **Ensure raster air conditioner is "ON"**
  
- \_\_\_ **Ensure polar crane is positioned over the entrance beam pipe, and that power is off at the power disconnect switch**
  
- \_\_\_ **Ensure that spectrometer entrance window guards are removed**
  
- \_\_\_ **Ensure that spectrometer exit window guards are removed**
  
- \_\_\_ **Ensure that detector VDC covers are removed**
  
- \_\_\_ **Ensure that target window guards are removed**
  
- \_\_\_ Ensure operability of shield house doors
  
- \_\_\_ Deliver checklist to work coordinator
  
- \_\_\_ Make the following entries into the HALOG
- \_\_\_ "Checklist Complete"
- \_\_\_ "Target Windows and HRS Entrance and Exit Window Guards are removed"
- \_\_\_ "L-HRS starting angle is \_\_\_\_\_ degrees"
- \_\_\_ "R-HRS starting angle is \_\_\_\_\_ degrees"
- \_\_\_ "L-HRS External Sieve is \_\_\_\_\_"
- \_\_\_ "R-HRS External Sieve is \_\_\_\_\_"
- \_\_\_ "The tech on call at startup is \_\_\_\_\_"

\*\*\*Note any outstanding issues not completed on the checklist

\*\*\*Note any special requirements or restrictions

Name of person checklist was delivered to \_\_\_\_\_ .