 Hall A Work Procedure		TITLE: TRITIUM PRE-BEAM CHECKLIST				
	ISSUING AUTHORITY	AUTHOR	DATE	DOCUMENT ID	REV.	Page 1 of 10
	Hall A	J. Butler	12/20/2017	A-17-005-P	1	

Tritium Pre-Beam Checklist

Last revised 12-20-2017

Date _____ time _____

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

Person(s) Completing Checklist _____

**** Please initial each item once it has been checked/verified****

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
- ___ Convectoron gages read "0 mT" rack # 1H71B01
- ___ Cold cathode gauge in rack # 1H71B01 < 5x10⁻⁵
- ___ Actual cold cathode reading _____

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

- ___ Ensure that Q2 lead heaters in rack 1H71B07 are on and operating at greater than 20° C
Actual lead temperatures left____ right____
- ___ Ensure that Q3 lead heaters in rack 1H71B08 are on and operating at greater than 25° C
Actual lead temperatures left____ right____
- ___ Ensure that Dipole lead heaters in rack OD171Q are on and operating at "left >15 & right > 25° C"
Actual lead temperatures left____ right____
- ___ Bogie power is ON ___ off ___

 Hall A Work Procedure		TITLE: TRITIUM PRE-BEAM CHECKLIST				
	ISSUING AUTHORITY	AUTHOR	DATE	DOCUMENT ID	REV.	Page 2 of 10
	Hall A	J. Butler	12/20/2017	A-17-005-P	1	

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 # OD171Q
- 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 0 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
- Ensure L-Dipole insulating vacuum pump is on, has sufficient oil and automatic valve is operational

 Hall A Work Procedure		TITLE: TRITIUM PRE-BEAM CHECKLIST				
	ISSUING AUTHORITY	AUTHOR	DATE	DOCUMENT ID	REV.	Page 3 of 10
	Hall A	J. Butler	12/20/2017	A-17-005-P	1	

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 < 5x10⁻⁵
- ___ Actual cold cathode reading _____

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

- ___ Ensure that Q2 lead heaters in rack 1H72B08 are on and operating at greater than 30° C
Actual lead temperatures left _____ right _____
- ___ Ensure that Q3 lead heaters in rack 1H72B07 are on and operating at greater than 25° C
Actual lead temperatures left _____ right _____
- ___ Ensure that Dipole lead heaters in rack OD172Q are on and operating at greater than 25° C
Actual lead temperatures left _____ right _____
- ___ Bogie power is ON ___ Off ___

 Hall A Work Procedure	TITLE: TRITIUM PRE-BEAM CHECKLIST					
	ISSUING AUTHORITY	AUTHOR	DATE	DOCUMENT ID	REV.	Page 4 of 10
	Hall A	J. Butler	12/20/2017	A-17-005-P	1	

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 (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

 Hall A Work Procedure		TITLE: TRITIUM PRE-BEAM CHECKLIST				
	ISSUING AUTHORITY	AUTHOR	DATE	DOCUMENT ID	REV.	Page 5 of 10
	Hall A	J. Butler	12/20/2017	A-17-005-P	1	

Left-HRS (from the computer)

Spectrometer controls

- Bogie controls checked for operation (do not move)
- N/A** 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 >105psi)
- Return pressure _____ psi (must be <50psi)

Q2


- Q2** full of liquid (80%) actual reading from computer _____
- Open lead flows on **Q2** to **75 slm** as read from the Hall A Tools page
- Actual lead flows A _____ B _____

D1

- Dipole** full of liquid (80%) actual reading from computer _____
- Open lead flows on **Dipole** to **75 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 _____

 Hall A Work Procedure	TITLE: TRITIUM PRE-BEAM CHECKLIST					
	ISSUING AUTHORITY	AUTHOR	DATE	DOCUMENT ID	REV.	Page 6 of 10
	Hall A	J. Butler	12/20/2017	A-17-005-P	1	

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 >105psi)
- Return pressure _____ psi (must be <50psi)

Q2


- Q2** full of liquid (80%) actual reading from computer _____
- Open lead flows on **Q2** to **75 slm** as read from the Hall A Tools page
- Actual lead flows A _____ B _____

D1

- Dipole** full of liquid (80%) actual reading from computer _____
- Open lead flows on **Dipole** to **75 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 **75 slm** as read from the Hall A Tools page
- Actual lead flows A _____ B _____

 Jefferson Lab <small>Thomas Jefferson National Accelerator Facility</small>	TITLE: TRITIUM PRE-BEAM CHECKLIST					
	ISSUING AUTHORITY	AUTHOR	DATE	DOCUMENT ID	REV.	Page 7 of 10
	Hall A Work Procedure	Hall A	J. Butler	12/20/2017	A-17-005-P	

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 does not _____

 Hall A Work Procedure	TITLE: TRITIUM PRE-BEAM CHECKLIST					
	ISSUING AUTHORITY	AUTHOR	DATE	DOCUMENT ID	REV.	Page 8 of 10
	Hall A	J. Butler	12/20/2017	A-17-005-P	1	

Target


- ___ Windows on & functional
- ___ CCTV cameras “on” and focused
- ___ Target light “on” Control located online at “hareboot6/logon.htm” 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 **500mT**
- ___ Convectron “0” millitorr at rack # 1H75B09
- ___ **Cold cathode < 5x10-5** 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.**

 Hall A Work Procedure	TITLE: TRITIUM PRE-BEAM CHECKLIST					
	ISSUING AUTHORITY	AUTHOR	DATE	DOCUMENT ID	REV.	Page 9 of 10
	Hall A	J. Butler	12/20/2017	A-17-005-P	1	

___ Ensure all beam line vacuum valves are “OPEN” (visually check VBVIH04 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** or on, in remote and no faults.
- ___ Ensure installation of Ion Chambers at Compton, Moeller, and Target Chamber
- ___ Correct LCW flow and pressure (≥ 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” and no faults on control panel.**
- ___ **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

 Hall A Work Procedure		TITLE: TRITIUM PRE-BEAM CHECKLIST				
	ISSUING AUTHORITY	AUTHOR	DATE	DOCUMENT ID	REV.	Page 10 of 10
Hall A	J. Butler	12/20/2017	A-17-005-P	1		

___ 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

___ Deliver checklist to work coordinator

Name of person checklist was delivered to _____ .