

*If you are using a printed copy of this procedure, and not the on-screen version, then you **MUST** make sure the dates at the bottom of the printed copy and the on-screen version match. The on-screen version of the Collider-Accelerator Department Procedure is the Official Version. Hard copies of all signed, official, C-A Operating Procedures are available by contacting the **ESSHQ Procedures Coordinator, Bldg. 911A***

C-A OPERATIONS PROCEDURES MANUAL

ATTACHMENT

4.120.72.a. LINAC Critical Device Tests

C-A-OPM Procedures in which this Attachment is used.		
4.120.72		

Hand Processed Changes

<u>HPC No.</u>	<u>Date</u>	<u>Page Nos.</u>	<u>Initials</u>
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Approved: _____ *Signature on File* _____
 Collider-Accelerator Department Chairman Date

V. Castillo

4.120.72.a LINAC Critical Device Tests

PASS ANNUAL ACCEPTANCE TEST PROTOCOL

Division A Software Filename and Checksum: Title: _____ **Checksum:** _____

Division B Software Filename and Checksum: Title: _____ **Checksum:** _____

Initial testing complete:

Test Team Leader's Name (Print): _____ **Life Number:** _____

Test Team Leader's Name (Sign): _____ **Date:** ____/____/____

Acceptance test procedure complete (following repairs and retesting if required):

Test Team Leader's Name (Print): _____ **Life Number:** _____

Test Team Leader's Name (Sign): _____ **Date:** ____/____/____

Test results reviewed by:

Safety Section Head's Name (Print): _____ **Life Number:** _____

Safety Section Head's Name (Sign): _____ **Date:** ____/____/____

Test results accepted by Radiation Safety Committee:

RSC Member's Name (Print): _____ **Life Number:** _____

RSC Member's Name (Sign): _____ **Date:** ____/____/____

1.1 Test of No Water-flow Failure to LEBT Beamstop 1 (BS 1)

- | | | | |
|--------------------------|---------------|---|-------------|
| <input type="checkbox"/> | VERIFY | At encl 4880 relay GK4 is | ON |
| <input type="checkbox"/> | VERIFY | At encl 4880 BS1-No Water light is | OFF |
| <input type="checkbox"/> | VERIFY | Valve for water-flow to BS1 is | OPEN |
| | CLOSE | Valve to stop water-flow to BS1 | |
| <input type="checkbox"/> | VERIFY | At encl 4880 relay GK4 is | OFF |
| <input type="checkbox"/> | VERIFY | At encl 4880 BS1-No Water light is | ON |
| | OPEN | Valve for water-flow to BS1 is | |
| <input type="checkbox"/> | VERIFY | At encl 4880 relay GK4 is | ON |
| <input type="checkbox"/> | VERIFY | At encl 4880 BS1-No Water light is | OFF |
- Check for acceptance of Test of No Water-flow Failure to LEBT Beamstop 1 (BS 1)**

1.2 Test Insertion/Extraction of LEBT Beamstop 1 (BS 1)

- | | | | |
|--------------------------|---------------|--|---------------|
| <input type="checkbox"/> | VERIFY | BS1 is | CLOSED |
| <input type="checkbox"/> | VERIFY | At encl 4880 relays: GK3 <input type="checkbox"/> , HK7 <input type="checkbox"/> and MK9 <input type="checkbox"/> are | ON |
| <input type="checkbox"/> | VERIFY | At encl 4880 relays: GK8 <input type="checkbox"/> and MK8 <input type="checkbox"/> are | OFF |
| | OPEN | BS1 | |
| <input type="checkbox"/> | VERIFY | At encl 4880 relays: GK3 <input type="checkbox"/> , HK7 <input type="checkbox"/> and MK9 <input type="checkbox"/> are | OFF |
| <input type="checkbox"/> | VERIFY | At encl 4880 relays: GK8 <input type="checkbox"/> and MK8 <input type="checkbox"/> are | ON |
| | CLOSE | BS1 | |
- Check for acceptance of Test Insertion/Extraction of LEBT Beamstop 1 (BS 1)**

1.3 Test of No Water-flow Failure to LEBT Beamstop 2 (BS 2)

- | | | | |
|--------------------------|---------------|---|-------------|
| <input type="checkbox"/> | VERIFY | At encl 4880 relay GK5 is | ON |
| <input type="checkbox"/> | VERIFY | At encl 4880 BS2-No Water light is | OFF |
| <input type="checkbox"/> | VERIFY | Valve for water-flow to BS2 is | OPEN |
| | CLOSE | Valve to stop water-flow to BS2 | |
| <input type="checkbox"/> | VERIFY | At encl 4880 relay GK5 is | OFF |
| <input type="checkbox"/> | VERIFY | At encl 4880 BS2-No Water light is | ON |
| | OPEN | Valve for water-flow to BS2 is | |
| <input type="checkbox"/> | VERIFY | At encl 4880 relay GK5 is | ON |
| <input type="checkbox"/> | VERIFY | At encl 4880 BS2-No Water light is | OFF |
- Check for acceptance of Test of No Water-flow Failure to LEBT Beamstop 2 (BS 2)**

1.4 Test Insertion/Extraction of LEBT Beamstop 2 (BS 2)

- VERIFY** **BS2** is **CLOSED**
- VERIFY** At encl 4880 relay **GK2** is **ON**
- VERIFY** At encl 4880 relay **GK9** is **OFF**
- OPEN** **BS2**
- VERIFY** At encl 4880 relay **GK2** is **OFF**
- VERIFY** At encl 4880 relay **GK9** is **ON**
- CLOSE** **BS2**

- Check for acceptance of Test Insertion/Extraction of LEBT Beamstop 2 (BS 2)**

1.5 Test of No Water-flow Failure to Linac Beamstop NZ304 (BS NZ304)

- VERIFY** At encl 4880 relay **HK10** is **ON**
- VERIFY** **Valve for water-flow to BS NZ304** is **OPEN**
- CLOSE** **Valve to stop water-flow to BS NZ304**
- VERIFY** At encl 4880 relay **HK10** is **OFF**
- OPEN** **Valve for water-flow to BS NZ304** is
- VERIFY** At encl 4880 relay **HK10** is **ON**

- Check for acceptance of Test of No Water-flow Failure to Linac Beamstop NZ304/307**

1.6 Test of No Water-flow Failure to Linac Beamstop NZ307 (BS NZ307)

- VERIFY** At encl 4880 relay **HK10** is **ON**
- VERIFY** **Valve for water-flow to BS NZ307** is **OPEN**
- CLOSE** **Valve to stop water-flow to BS NZ307**
- VERIFY** At encl 4880 relay **HK10** is **OFF**
- OPEN** **Valve for water-flow to BS NZ307** is
- VERIFY** At encl 4880 relay **HK10** is **ON**

- Check for acceptance of Test of No Water-flow Failure to Linac Beamstop NZ304/307**

1.7 Test Insertion Readback relay for Linac Beamstops NZ304 & 307 (BSs NZ304 & 307)

- VERIFY** **BSs NZ304 & 307** are **CLOSED**
- VERIFY** At encl 4880 relay **HK9** is **ON**
- TURN OFF** **Relay HK9**
- VERIFY** At encl 4880 relay **HK9** is **OFF**
- TURN ON** **Relay HK9**
- VERIFY** At encl 4880 relay **HK9** is **ON**
- VERIFY** **BSs NZ304 & 307** are **CLOSED**

- Check for acceptance of Test Insertion/Extraction of Linac Beamstop NZ304/307**

1.8 Test of RFQ High Voltage OFF

- VERIFY** At encl 4880 relay **MK3** is **ON**
- VERIFY** At encl 4880 **RFQ 1 HV OFF** light is **ON**
- VERIFY** At encl 4880 relays: **CK4** and **CK9** are **ON**
- SET** **RFQ 1 HV to ON** by removing **MK3**
- VERIFY** At encl 4880 **RFQ 1 HV OFF** light is **OFF**
- VERIFY** At encl 4880 relays: **CK4** and **CK9** are **OFF**

- SET** **RFQ 1 HV to OFF** by replacing **MK3**
- VERIFY** At encl 4880 relay **MK3** is **ON**
- VERIFY** At encl 4880 **RFQ 1 HV OFF** light is **ON**
- VERIFY** At encl 4880 relays: **CK4** and **CK9** are **ON**

- Check for acceptance of Test of RFQ High Voltage OFF**

1.9 Test of Kirk Key located at Encl 4880 or Bkr Panel M1A3A4

- VERIFY** At encl 4880 relay **Kirk key # RE11357** is **CAPTURED**
- VERIFY** At encl 4880 **Tank 1 Operational** light is **OFF**
- VERIFY** At encl 4880 relay **FK7** is **ON**

- REMOVE** **Kirk key # RE11357** from encl 4880

- VERIFY** At encl 4880 **Tank 1 Operational** light is **ON**
- VERIFY** At encl 4880 relay **FK7** is **OFF**

- CAPTURE** **Kirk key # RE11357** in encl 4880
- VERIFY** At encl 4880 **Tank 1 Operational** light is **OFF**
- VERIFY** At encl 4880 relay **FK7** is **ON**

- Check for acceptance of Test of Kirk Key at Encl 4880**

1.10 Test of Linac Safely OFF for BLIP and REF

- VERIFY** At encl 4880 relay **HK4** is **OFF**
- VERIFY** At BLIP panel B relay **BK1** is **OFF**

- Turn ON** At encl 4880 relay **HK4**
- VERIFY** At encl 4880 relay **HK4** is **ON**
- VERIFY** At BLIP panel B relay **BK1** is **ON**

- Turn OFF** At encl 4880 relay **HK4**
- VERIFY** At encl 4880 relay **HK4** is **OFF**
- VERIFY** At BLIP panel B relay **BK1** is **OFF**

- Check for acceptance of Test of Linac Safely OFF and BLIP**

1.11 Test of Booster Failure Reachback

- VERIFY** At encl 4521 in the Booster **relay IK5, Booster Failure Reachback** is **ON**
- VERIFY** At encl 4880 **relay LK1** is **ON**

- Turn OFF** At encl 4521 **relay IK5**
- OBSERVE** 2-3 sec **Time Delay**
- VERIFY** At encl 4521 **relay IK5** is **OFF**
- VERIFY** At encl 4880 **relay LK1** is **OFF**

- Check for acceptance of Test of Booster Failure Reachback**

1.12 Test of Linac Reachback Reset from MCR

- RESET** **Linac Reachback** from MCR with **H693 key and Reset button**
- VERIFY** At encl 4880 **relay CK10** is **ON**

- Turn OFF** At encl 4880 **relay MK14**
- VERIFY** At **MCR** Linac Reachback reset is **OFF**
- VERIFY** At encl 4880 **relay CK10** is **OFF**

- Turn ON** At encl 4880 **relay MK14**
- RESET** **Linac Reachback** from MCR with **H693 key and Reset button**

- Check for acceptance of Test of Linac Reachback Reset from MCR**

1.13 Test of HEBT Bending Magnets 1 & 2 interlocking LEBT BS2 on D40 - E014

SET Logic states of relays: **BK2, BK3, BK4** and **BK5** at **BLIP panel B**
VERIFY State of **CK7** at encl 4880 in columns 6 and 7

BK2 BM 1 OFF	BK3 BM 2 OFF	BK4 Intlks OK Pri	BK5 Intlks OK Rdn	Verify CK7 (LEBT BS2 Intlk OK)	
				ON	OFF
ON	ON	ON	ON	☐	xxxxxxx
OFF	ON	ON	ON	☐	xxxxxxx
ON	OFF	ON	ON	☐	xxxxxxx
ON	ON	OFF	ON	☐	xxxxxxx
ON	ON	ON	OFF	☐	xxxxxxx
OFF	ON	OFF	ON	xxxxxxx	☐
ON	OFF	OFF	ON	xxxxxxx	☐
OFF	ON	ON	OFF	xxxxxxx	☐
ON	OFF	ON	OFF	xxxxxxx	☐

Table 1 - Logic states of HEBT BM relays controlling LEBT BS2

- ☐ Check for acceptance of Test of HEBT Bending Magnets 1 & 2 interlocking LEBT BS2

1.14 BLIP tests from BLIP Control Room (BCR) to BLIP panel A in the LINAC

- ☐ **VERIFY** BLIP chipmunk #1 Radiation level is **O.K.**
- ☐ **VERIFY** Relay **K1** in **BLIP panel A** is **ON**
- ☐ **VERIFY** Radiation Led on **BLIP panel A** is **ON**
- ☐ **VERIFY** Relay **K11** in **BLIP panel A** is **ON**
- HAVE** **BCR Operator TRIP BLIP chipmunk #1**
- ☐ **VERIFY** Relay **K1** in **BLIP panel A** is **OFF**
- ☐ **VERIFY** Radiation Led on **BLIP panel A** is **OFF**
- ☐ **VERIFY** **Primary Interlock clear** light on **BLIP panel A** is **OFF**
- ☐ **VERIFY** Relay **K11** in **BLIP panel A** is **OFF**
- ☐ **VERIFY** **BLIP chipmunk #1 Radiation level** is **O.K.**
- ☐ **VERIFY** Relay **K1** in **BLIP panel A** is **ON**
- ☐ **VERIFY** Radiation Led on **BLIP panel A** is **ON**
- ☐ **VERIFY** Relay **K11** in **BLIP panel A** is **OFF**
- RESET** **Primary Interlock clear** with **Reset** button on **BLIP panel A**
- ☐ **VERIFY** **Primary Interlock clear** light on **BLIP panel A** is **ON**
- ☐ **VERIFY** Relay **K1** in **BLIP panel A** is **ON**
- ☐ **VERIFY** Radiation Led on **BLIP panel A** is **ON**
- ☐ **VERIFY** Relay **K11** in **BLIP panel A** is **ON**

- ☐ **VERIFY** **BLIP Water level 1** is **O.K.**
- ☐ **VERIFY** Relay **K3** in **BLIP panel A** is **ON**
- ☐ **VERIFY** Relay **K11** in **BLIP panel A** is **ON**
- ☐ **VERIFY** **Water level 1 Led** on **BLIP panel A** is **ON**

	HAVE	BCR Operator fault Water Level 1	
<input type="checkbox"/>	VERIFY	Relay K3 in BLIP panel A is	OFF
<input type="checkbox"/>	VERIFY	Water Level 1 Led on BLIP panel A is	OFF
<input type="checkbox"/>	VERIFY	Relay K11 in BLIP panel A is	OFF
<input type="checkbox"/>	VERIFY	Primary Interlock clear light on BLIP panel A is	OFF
	HAVE	BCR Operator set Water Level 1	O.K.
<input type="checkbox"/>	VERIFY	Relay K3 in BLIP panel A is	ON
<input type="checkbox"/>	VERIFY	Water Level 1 Led on BLIP panel A is	ON
<input type="checkbox"/>	VERIFY	Relay K11 in BLIP panel A is	OFF
	RESET	Primary Interlock clear with Reset button on BLIP panel A	
<input type="checkbox"/>	VERIFY	Relay K11 in BLIP panel A is	ON
<input type="checkbox"/>	VERIFY	Primary Interlock clear light on BLIP panel A is	ON
<input type="checkbox"/>	VERIFY	Relay K3 in BLIP panel A is	ON
<input type="checkbox"/>	VERIFY	Water Level 1 Led on BLIP panel A is	ON
<input type="checkbox"/>	VERIFY	BLIP Water level 2 is	O.K.
<input type="checkbox"/>	VERIFY	Relay K8 in BLIP panel A is	ON
<input type="checkbox"/>	VERIFY	Water level 2 Led on BLIP panel A is	ON
<input type="checkbox"/>	VERIFY	Relay K12 in BLIP panel A is	ON
	HAVE	BCR Operator fault Water Level 2	
<input type="checkbox"/>	VERIFY	Relay K8 in BLIP panel A is	OFF
<input type="checkbox"/>	VERIFY	Relay K12 in BLIP panel A is	OFF
<input type="checkbox"/>	VERIFY	Water Level 2 Led on BLIP panel A is	OFF
<input type="checkbox"/>	VERIFY	Redundant Interlock clear light on BLIP panel A is	OFF
	HAVE	BCR Operator set Water Level 2	O.K.
<input type="checkbox"/>	VERIFY	Relay K8 in BLIP panel A is	ON
<input type="checkbox"/>	VERIFY	Water Level 2 Led on BLIP panel A is	ON
<input type="checkbox"/>	VERIFY	Relay K12 in BLIP panel A is	OFF
	RESET	Redun Interlock clear with Reset button on BLIP panel A	
<input type="checkbox"/>	VERIFY	Relay K12 in BLIP panel A is	ON
<input type="checkbox"/>	VERIFY	Redundant Interlock clear light on BLIP panel A is	ON
<input type="checkbox"/>	VERIFY	Relay K8 in BLIP panel A is	ON
<input type="checkbox"/>	VERIFY	Water Level 2 Led on BLIP panel A is	ON
<input type="checkbox"/>	VERIFY	BLIP Inspection Plug Shield 1 is	O.K.
<input type="checkbox"/>	VERIFY	Relay K4 in BLIP panel A is	ON
<input type="checkbox"/>	VERIFY	Relay K11 in BLIP panel A is	ON
<input type="checkbox"/>	VERIFY	Inspection Plug Shield 1 Led on BLIP panel A is	ON
	HAVE	BCR Operator fault Inspection Plug Shield 1	
<input type="checkbox"/>	VERIFY	Relay K4 in BLIP panel A is	OFF
<input type="checkbox"/>	VERIFY	Relay K11 in BLIP panel A is	OFF
<input type="checkbox"/>	VERIFY	Inspection Plug Shield 1 Led on BLIP panel A is	OFF
<input type="checkbox"/>	VERIFY	Primary Interlock clear light on BLIP panel A is	OFF
	HAVE	BCR Operator set Inspection Plug Shield 1	O.K.
<input type="checkbox"/>	VERIFY	Relay K4 in BLIP panel A is	ON
<input type="checkbox"/>	VERIFY	Inspection Plug Shield 1 Led on BLIP panel A is	ON
<input type="checkbox"/>	VERIFY	Relay K11 in BLIP panel A is	OFF
	RESET	Primary Interlock clear with Reset button on BLIP panel A	
<input type="checkbox"/>	VERIFY	Relay K11 in BLIP panel A is	ON
<input type="checkbox"/>	VERIFY	Primary Interlock clear light on BLIP panel A is	ON
<input type="checkbox"/>	VERIFY	Relay K4 in BLIP panel A is	ON
<input type="checkbox"/>	VERIFY	Inspection Plug Shield 1 Led on BLIP panel A is	ON

- | | | | |
|--------------------------|---------------|---|-------------|
| <input type="checkbox"/> | VERIFY | BLIP Inspection Plug Shield 2 is | O.K. |
| <input type="checkbox"/> | VERIFY | Relay K9 in BLIP panel A is | ON |
| <input type="checkbox"/> | VERIFY | Relay K12 in BLIP panel A is | ON |
| <input type="checkbox"/> | VERIFY | Inspection Plug Shield 2 Led on BLIP panel A is | ON |
| | HAVE | BCR Operator fault Inspection Plug Shield 2 | |
| <input type="checkbox"/> | VERIFY | Relay K9 in BLIP panel A is | OFF |
| <input type="checkbox"/> | VERIFY | Relay K12 in BLIP panel A is | OFF |
| <input type="checkbox"/> | VERIFY | Inspection Plug Shield 2 Led on BLIP panel A is | OFF |
| <input type="checkbox"/> | VERIFY | Redundant Interlock clear light on BLIP panel A is | OFF |
| | HAVE | BCR Operator set Inspection Plug Shield 2 | O.K. |
| <input type="checkbox"/> | VERIFY | Relay K12 in BLIP panel A is | OFF |
| <input type="checkbox"/> | VERIFY | Relay K9 in BLIP panel A is | ON |
| <input type="checkbox"/> | VERIFY | Inspection Plug Shield 2 Led on BLIP panel A is | ON |
| | RESET | Redun Interlock clear with Reset button on BLIP panel A | |
| <input type="checkbox"/> | VERIFY | Redundant Interlock clear light on BLIP panel A is | ON |
| <input type="checkbox"/> | VERIFY | Relay K9 in BLIP panel A is | ON |
| <input type="checkbox"/> | VERIFY | Relay K12 in BLIP panel A is | ON |
| <input type="checkbox"/> | VERIFY | Inspection Plug Shield 2 Led on BLIP panel A is | ON |
|
 | | | |
| <input type="checkbox"/> | VERIFY | BLIP Vacuum is | O.K. |
| <input type="checkbox"/> | VERIFY | Relay K6 in BLIP panel A is | ON |
| <input type="checkbox"/> | VERIFY | Vacuum Led on BLIP panel A is | ON |
|
 | | | |
| <input type="checkbox"/> | | Check for acceptance of BLIP tests from BLIP Control Room (BCR) to BLIP panel A in the LINAC | |

1.15 Test of HEBT Bending Magnet 1 Power Supply under Power

- | | | | |
|--------------------------|---------------|--|-------------|
| <input type="checkbox"/> | VERIFY | HEBT Bending Magnet 1 (HBM1) Power Supply is | OFF |
| <input type="checkbox"/> | VERIFY | At BLIP panel A Prim Interlock Clear (PIC) light is | ON |
| <input type="checkbox"/> | VERIFY | At BLIP panel A Redun Interlock Clear (RIC) light is | ON |
| <input type="checkbox"/> | VERIFY | Radiation Led on BLIP panel A is | ON |
| | TURN | Relay BK1 , Linac Safety OFF , in BLIP | |
| | OFF | Panel B | |
| <input type="checkbox"/> | VERIFY | Relay BK1 is | OFF |
| | HAVE | LINAC Operator Turn ON HBM1 Power Supply | |
| <input type="checkbox"/> | VERIFY | HBM1 Power Supply is | ON |
| | HAVE | BCR Operator TRIP BLIP chipmunk | |
| <input type="checkbox"/> | VERIFY | Radiation Led on BLIP panel A is | OFF |
| <input type="checkbox"/> | VERIFY | Primary Interlock clear light on BLIP panel A is | OFF |
| <input type="checkbox"/> | VERIFY | HBM1 Power Supply is | OFF |
| <input type="checkbox"/> | VERIFY | BLIP chipmunk Radiation Level is | OK |
| <input type="checkbox"/> | VERIFY | Radiation Led on BLIP panel A is | OFF |
| <input type="checkbox"/> | VERIFY | Attempt to Turn ON HBM1 Power Supply | FAIL |
| | RESET | Primary Interlock at BLIP panel A | |
| <input type="checkbox"/> | VERIFY | At BLIP panel A Prim Interlock Clear (PIC) light is | ON |

- VERIFY** **Radiation Led** on **BLIP panel A** is **ON**
- VERIFY** Attempt to **Turn ON HBM1 Power Supply** **SUCCESSFUL**
- HAVE** **LINAC Operator** Turn **OFF HBM1 Power Supply**
- VERIFY** **HBM1 Power Supply** is **OFF**
- TURN ON** Relay **BK1** in **BLIP panel B**
- VERIFY** Relay **BK1** is **ON**

- Check for acceptance of Test of HEBT Bending Magnet 1 Power Supply under Power**

1.16 Test of HEBT Bending Magnet 2 Power Supply under Power

- VERIFY** HEBT Bending Magnet 2 (**HBM2**) **Power Supply** is **OFF**
- VERIFY** At **BLIP panel A** Prim Interlock Clear (**PIC**) light is **ON**
- VERIFY** At **BLIP panel A** Redun Interlock Clear (**RIC**) light is **ON**
- VERIFY** **Radiation Led** on **BLIP panel A** is **ON**
- TURN OFF** Relay **BK1**, Linac Safety **OFF**, in **BLIP Panel B**
- VERIFY** Relay **BK1** is **OFF**
- HAVE** **LINAC Operator** Turn **ON HBM2 Power Supply**
- VERIFY** **HBM2 Power Supply** is **ON**
- HAVE** **BCR Operator** **TRIP BLIP chipmunk**
- VERIFY** **Radiation Led** on **BLIP panel A** is **OFF**
- VERIFY** **Primary Interlock clear** light on **BLIP panel A** is **OFF**
- VERIFY** **HBM2 Power Supply** is **OFF**
- VERIFY** **BLIP chipmunk Radiation Level** is **OK**
- VERIFY** **Radiation Led** on **BLIP panel A** is **OFF**
- VERIFY** Attempt to **Turn ON HBM2 Power Supply** **FAIL**
- RESET** **Primary Interlock at BLIP panel A**
- VERIFY** At **BLIP panel A** Prim Interlock Clear (**PIC**) light is **ON**
- VERIFY** **Radiation Led** on **BLIP panel A** is **ON**
- VERIFY** Attempt to **Turn ON HBM2 Power Supply** **SUCCESSFUL**
- HAVE** **LINAC Operator** Turn **OFF HBM2 Power Supply**
- VERIFY** **HBM2 Power Supply** is **OFF**
- TURN ON** Relay **BK1** in **BLIP Panel B**
- VERIFY** Relay **BK1** is **ON**

- Check for acceptance of Test of HEBT Bending Magnet 2 Power Supply under Power**

1.17 Test of Tank RF Pulsing and 50KV HV under power

- PLACE** Tank area on **Tank RF CA** with **ME16** key at encl 4880
- VERIFY** Tank area is on **CA**
- VERIFY** At encl 4880 relays: **FK3** and **CK2** are **ON**
- RESET** **Tnk 9 gate** for **RF**
- VERIFY** Relay **1k3** is **ON**
- RESET** **Tnk 1 gate** for **RF**
- VERIFY** Relay **DK6** is **ON**
- VERIFY** Tank **RF Pulsing** **CLEARED**
- VERIFY** Relays: **IK11** and **FK2** are **ON**
- VERIFY** Linac **Tnk crash** ok: **BK2** and **AK9** are **ON**

- | | | | |
|--------------------------|---------------|--|-------------|
| <input type="checkbox"/> | VERIFY | Tnk1 gate crash ok, DK4 is | ON |
| <input type="checkbox"/> | VERIFY | Tnk9 gate crash ok, IK2 is | ON |
| <input type="checkbox"/> | VERIFY | RF 50KV Power Supplies Interlock IK5 | ON |
| | HAVE | Linac Operator Turn ON 50 KV Power Supplies | |
| <input type="checkbox"/> | VERIFY | With Operator 50 KV PSs are | ON |
| | HAVE | Linac Operator Turn ON Tank RF Pulsing | |
| <input type="checkbox"/> | VERIFY | With Operator Tank RF Pulsing is | ON |
| | OPEN | Tnk1 gate and hold open | |
| <input type="checkbox"/> | VERIFY | With Linac Operator Tank RF Pulsing immediately goes | OFF |
| <input type="checkbox"/> | VERIFY | Relays: IK11 <input type="checkbox"/> and FK2 <input type="checkbox"/> are | OFF |
| <input type="checkbox"/> | VERIFY | With Linac Operator attempt to turn ON Tank RF Pulsing | FAIL |
| <input type="checkbox"/> | VERIFY | ~ _____ secs (120 secs ok) 50 KV PSs go | OFF |
| <input type="checkbox"/> | VERIFY | Relay 1K1 , Tank area door open too long | OFF |
| <input type="checkbox"/> | VERIFY | Relay CK2 , Tank RF CA | OFF |
| <input type="checkbox"/> | VERIFY | Relay IK5 , RF 50 KV PSs Interlock OK | OFF |
| <input type="checkbox"/> | VERIFY | With Linac Operator attempt to Turn ON RF 50KV PSs | FAIL |
| | CLOSE | Tank 1 gate | |
| <input type="checkbox"/> | | Check for acceptance of Test of Tank RF Pulsing and 50KV HV under power | |

1.18 Test of RFQ #1 30KV Power Supply under power

- | | | | |
|--------------------------|-----------------|---|-------------|
| <input type="checkbox"/> | VERIFY | With Linac Operator RFQ #1 30KV PS is | OFF |
| <input type="checkbox"/> | VERIFY | At encl 4880 relay MK3 , RFQ #1 OFF is | ON |
| <input type="checkbox"/> | VERIFY | At encl 4880 Relay FK10, BS1 failure is | ON |
| <input type="checkbox"/> | VERIFY | At encl 4880 Relay GK1, BS2 failure is | ON |
| <input type="checkbox"/> | VERIFY | At encl 4880 Relay MK14, LEBT BS failure is | ON |
| <input type="checkbox"/> | PULSE | MK14 for 1 Second | |
| | OFF | | |
| <input type="checkbox"/> | VERIFY | At encl 4880 Relay CK10, BS1 or 2 failure is | OFF |
| | RESET | CK10 at MCR Rchback panel with H693 key and PB | |
| <input type="checkbox"/> | VERIFY | At encl 4880 Relay CK10, BS1 or 2 failure is | ON |
| | HAVE | Linac Operator Turn ON RFQ #1 30KV PS | |
| <input type="checkbox"/> | VERIFY | With Linac Operator RFQ #1 30KV PS is | ON |
| | Turn OFF | At encl 4880 Relay FK10, BS1 failure | |
| <input type="checkbox"/> | VERIFY | With Linac Operator RFQ #1 30KV PS is | OFF |
| | Turn ON | At encl 4880 Relay FK10, BS1 failure | |
| <input type="checkbox"/> | VERIFY | At encl 4880 Relay FK10, BS1 failure | ON |
| <input type="checkbox"/> | VERIFY | With Linac Operator attempt to Turn ON RFQ #1 30KV PS | FAIL |
| <input type="checkbox"/> | VERIFY | At encl 4880 Relay MK14, LEBT BS failure is | ON |
| <input type="checkbox"/> | VERIFY | At encl 4880 Relay CK10, BS1 or 2 failure is | OFF |
| | RESET | CK10 at MCR Rchback panel with H693 key and PB | |

- VERIFY** At encl 4880 Relay **CK10, BS1 or 2 failure** is **ON**
- VERIFY** With Linac Operator **attempt to Turn ON RFQ #1 30KV PS** **SUCCESSFUL**
- Turn OFF** At encl 4880 Relay **GK1, BS2 failure**
- VERIFY** With Linac **Operator RFQ #1 30KV PS** is **OFF**
- Turn ON** At encl 4880 Relay **GK1, BS2 failure**
- VERIFY** At encl 4880 Relay **GK1, BS2 failure** **ON**
- VERIFY** With Linac Operator **attempt to Turn ON RFQ #1 30KV PS** **FAIL**
- VERIFY** At encl 4880 Relay **MK14, LEBT BS failure** is **ON**
- VERIFY** At encl 4880 Relay **CK10, BS1 or 2 failure** is **OFF**
- RESET** CK10 at **MCR** Rchback panel with **H693 key and PB**
- VERIFY** At encl 4880 Relay **CK10, BS1 or 2 failure** is **ON**
- VERIFY** With Linac Operator **attempt to Turn ON RFQ #1 30KV PS** **SUCCESSFUL**
- HAVE** Linac **Operator Turn OFF RFQ #1 30KV PS**
- VERIFY** With Linac **Operator RFQ #1 30KV PS** is **OFF**
- Check for acceptance of Test of Tank RF Pulsing and 50KV HV under power**

END OF TEST PROCEDURE

TTL: Sign for completion of initial testing: _____

Date: ____/____/____

TTL: Sign for completion of final testing: _____

Date: ____/____/____