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C-A OPERATIONS PROCEDURES MANUAL

4.120.18.i RHIC Roll-Up Tests

Text Page 2

Hand Processed Changes

<u>HPC No.</u>	<u>Date</u>	<u>Page Nos.</u>	<u>Initials</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Approved: _____ ***Signature on File*** _____
Collider-Accelerator Department Chairman Date

V. Castillo

4.120.18.i RHIC Roll-Up 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 Confirm RF Supplies Enable in MODE 24

- VERIFY** **RF Transfer** key is in **MCR** and is **CAPTURED**

- PLACE** **Peer 9** in **Controlled Access (Mode 16)**
- VERIFY** **MCR** sees **Peer 9** is in **MODE 16**
- CLOSE** Gate: **5GS1**
- RESET** Gates: **3GI1, 3EL1, 4MD1, 4GE1, 4MD2, 4GE2, 4GI1, 4EL1, 4GE3, 4ED1**
- VERIFY** Gates: **3GI1** , **3EL1** , **4MD1** , **4GE1** , **4MD2** , **4GE2** , **4GI1** , **4EL1** , **4GE3** , **4ED1** are **RESET**
- SWEEP** Zones: **4Z1** and **4Z2**
- VERIFY** Zones: **4Z1** and **4Z2** **SWEEP OK**
- VERIFY** 3 ea #10 RF CA keys and 2 ea #11 RF Sweep keys are **CAPTURED**
- VERIFY** **RF Key Tree Complete** indicator is **ON**
- VERIFY** **RF Reset** indicator is **OFF**
- VERIFY** **MCR** sees on **Summary Page CD1: A Div** , **B Div** **SAFE**
- VERIFY** **MCR** sees on **Summary Page CD2: A Div** , **B Div** **SAFE**

- PLACE** **Peer 9** in **NO Access (Mode 24)**
- VERIFY** **MCR** sees **Peer 9** is in **MODE 24**

- VERIFY** **MCR** sees on **Summary Page CD1: A Div** , **B Div** **ENABLED**
- VERIFY** **MCR** sees on **Summary Page CD2: A Div** , **B Div** **ENABLED**
- REMOVE** **LOTO** from **ACS Ckt Bkr Lockout Box (ACLB)**
- VERIFY** **ACLB** is **NO LOTO**
- VERIFY** In **Table-1** below, **MCR** sees on **RF Critical Devices** page

RF Power Supply	Verify for CD1-AC contator RB goes from SAFE to OFF		Verify for CD2-DC Ross RB goes from SAFE to OFF		Turn ON Ckt Bkr for RF PS	Verify for RF Rchback C kt. Bkr. is ON	
	A - Div	B - Div	A - Div	B - Div		A - Div	B - Div
Y04 – CAVA 3.1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Y04 – CAVA 3.2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
B14 – CAVA 3.1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
B14 – CAVA 3.2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Y04 – CAVS 3.1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Y04 – CAVS 3.2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Y04 – CAVS 3.3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
B14 – CAVS 3.1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
B14 – CAVS 3.2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
B14 – CAVS 3.3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
G4 – CAVSX 1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>

<u>RF Power Supply</u>	Verify for CD1-AC contator RB goes from SAFE to OFF		Verify for CD2-DC Ross RB goes from SAFE to OFF		Turn ON Ckt Bkr for RF PS	Verify for RF Rchback Ckt. Bkr. is ON	
	A - Div	B - Div	A - Div	B - Div		A - Div	B - Div
<u>G4 - CAVSX 2</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
<u>G4 - CAVSX 3</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
<u>G4 - CAVSX 4</u>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>

Table – 1: Verification of CD1, CD2 and RF Power supplies Enabled in Mode 24

- Check for confirmation RF Supplies Enable is possible in Mode 24.

1.2 Confirm delay between disabling RF CD1 and RF CD2 is > 2 secs and < 4 secs

- PLACE** Peer 9 in NO Access (Mode 24)
- VERIFY** MCR sees Peer 9 is in **MODE 24**
- VERIFY** MCR sees on **Summary Page CD1: A Div B Div** **ENABLED**
- VERIFY** MCR sees on **Summary Page CD2: A Div B Div** **ENABLED**
- VERIFY** In RF Crit. Dev. Encl. **1004A A1 outputs: 0 =CD1 & 1 = CD2** are **ON**
- VERIFY** In RF Crit. Dev. Encl. **1004A B1 outputs: 0 =CD1 & 1 = CD2** are **ON**
- REMOVE** Key from RF Key tree
- VERIFY** Time **delay** between A1 output 0 & 1 going **OFF** is **>2 & <4 secs**
- VERIFY** Time **delay** between B1 output 0 & 1 going **OFF** is **>2 & <4 secs**
- Check for confirmation of delay between disabling RF CD1 and RF CD2 is > 2 secs and < 4 secs

1.3 Confirm to ACS Interface Panel (AIP) Enable of Injection RchBack Critical Devices: PSUarc8 and PSWarc20 in Mode 24 is possible

	STATION	ACS Person at A-Hse (PSUarc8) and 1000P (PSWarc20)	
	PLACE	Peers 5, 7, 9, 11, 13, 15, 17 in Controlled Access (Mode16)	
<input type="checkbox"/>	VERIFY	MCR sees Peers 5 <input type="checkbox"/>, 7 <input type="checkbox"/>, 9 <input type="checkbox"/>, 11 <input type="checkbox"/>, 13 <input type="checkbox"/>, 15 <input type="checkbox"/>, 17 <input type="checkbox"/> is in	MODE 16
	SWEEP	All RHIC Zones	
<input type="checkbox"/>	VERIFY	All RHIC Zones are	SWEEP OK
<input type="checkbox"/>	VERIFY	At A-Hse PSUarc8 Enable red bullseye on AIP is	OFF
<input type="checkbox"/>	VERIFY	At 1000P PSWarc20 Enable red bullseye on AIP is	OFF
<input type="checkbox"/>	VERIFY	MCR sees on CD page: Rhic Injn U/W	DISABLED
	PLACE	Peers 5, 7, 9, 11, 13, 15, 17 in No Access (Mode24)	
<input type="checkbox"/>	VERIFY	MCR sees Peers 5 <input type="checkbox"/>, 7 <input type="checkbox"/>, 9 <input type="checkbox"/>, 11 <input type="checkbox"/>, 13 <input type="checkbox"/>, 15 <input type="checkbox"/>, 17 <input type="checkbox"/> is in	MODE 24
<input type="checkbox"/>	VERIFY	At A-Hse PSUarc8 Enable red bullseye on AIP is	ON
<input type="checkbox"/>	VERIFY	At 1000P PSWarc20 Enable red bullseye on AIP is	ON
<input type="checkbox"/>	VERIFY	MCR sees on CD page: Rhic Injn U/W	ENABLED
<input type="checkbox"/>	Check for acceptance of Confirm to ACS Interface Panel (AIP) Enable of Injection RchBack Critical Devices: PSUarc8 and PSWarc20 in Mode 24 is possible		

1.4 Confirm opening a gate into the RHIC ring disables RHIC Injection Critical Devices & RHIC Critical Devices

	STATION	ACS person at 1000P	
<input type="checkbox"/>	VERIFY	MCR sees Peers 5 <input type="checkbox"/>, 7 <input type="checkbox"/>, 9 <input type="checkbox"/>, 11 <input type="checkbox"/>, 13 <input type="checkbox"/>, 15 <input type="checkbox"/>, 17 <input type="checkbox"/> in	MODE 24
<input type="checkbox"/>	VERIFY	MCR sees Permit Link for Peers 7 <input type="checkbox"/>, 9 <input type="checkbox"/>, 11 <input type="checkbox"/>, 13 <input type="checkbox"/>, 15 <input type="checkbox"/>, 17 <input type="checkbox"/>	ENABLED
<input type="checkbox"/>	VERIFY	At 1000P PSSwm Enable red bullseye on AIP is	ON
<input type="checkbox"/>	VERIFY	At 1000P PSXarc90 Enable red bullseye on AIP is	ON
<input type="checkbox"/>	VERIFY	At 1000P PSYarc90 Enable red bullseye on AIP is	ON
<input type="checkbox"/>	VERIFY	MCR sees on CD page: Rhic Injn X/Y	ENABLED
<input type="checkbox"/>	VERIFY	A Div relay # 57 <input type="checkbox"/> and B Div relay # 59 <input type="checkbox"/> in encl 5602-1 in 1000P	ON
	PRESS	RHIC Primary Beam Stop Withdraw in MCR	
<input type="checkbox"/>	VERIFY	MCR sees Primary Beam Shutters: G1BS, G2BS	OUT
<input type="checkbox"/>	VERIFY	MCR sees RchBack Beam Shutter: G3BS	OUT
	FOLLOW	Table – 1 below, pg 3	

Gate	Open then Close	Verify Peer moves to Mode 2	Verify Sweep lost	Verify Rhic Ijn CDs Disab. & B/eyes OFF	Verify RhBack CDs OK	Verify Rhic Ring BS G1& G2 IN	Verify Rhic Ring RhBack BS G3 OUT	Verify Permit Link Disab.	Verify relays 57&59 OFF	Verify attempt to w/draw BS G1 & G2 FAIL	Force Sweep	Go to Mode 24	Verify Permit Link Enab.	Verify Rhic Ijn CDs Enab. & B/eyes ON	W/draw Rhic Ring BS G1 & G2	Go to next gate
12GE1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		
2GE1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		
2GE2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		
4GE2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		
4GE3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		
5GE1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		
YGI1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		
6GE2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		
XGI1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		
6GE3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		
7GE1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		
8GE1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		
8GE2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		
10GE1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	<input type="checkbox"/>		End of test

Table – 1: Test of gate-opening into the RHIC ring disables RHIC Injection Critical Devices & RHIC Critical Devices

Check for confirmation of opening a gate into the RHIC ring disables RHIC Injection Critical Devices & RHIC Critical Devices

1.5 Confirm interrupting readback signal from PSSWM causes a Rchback; restore operation

- | | | | |
|--------------------------|---|--|---------------------|
| | PLACE | Peers 7, 9, 11, 13, 15, 17 in Restricted Access (Mode 8) | |
| <input type="checkbox"/> | VERIFY | MCR sees Peers 7 <input type="checkbox"/> , 9 <input type="checkbox"/> , 11 <input type="checkbox"/> , 13 <input type="checkbox"/> , 15 <input type="checkbox"/> , 17 <input type="checkbox"/> is in | MODE 8 |
| <input type="checkbox"/> | VERIFY | MCR sees: PSUARC8 <input type="checkbox"/> , PSWARC20 <input type="checkbox"/> are | DISABLED |
| | REMOVE | Readback relay, K1 , for PSSWM in CD Inface Box for X,Y& SwM encl 5611in 1000P | |
| <input type="checkbox"/> | VERIFY | MCR sees Div A <input type="checkbox"/> , Div B <input type="checkbox"/> | Reachback |
| <input type="checkbox"/> | VERIFY | MCR sees: PSUARC8 <input type="checkbox"/> , PSWARC20 <input type="checkbox"/> are | DISABLED |
| | REPLACE | Readback relay, K1 , for PSSWM in CD Inface Box for X,Y& SwM encl 5611in 1000P | |
| | RESET | Reachback in MCR | |
| <input type="checkbox"/> | VERIFY | MCR sees Div A <input type="checkbox"/> , Div B <input type="checkbox"/> RchBack | Reachback OK |
| <input type="checkbox"/> | VERIFY | MCR sees: PSUARC8 <input type="checkbox"/> , PSWARC20 <input type="checkbox"/> are | DISABLED |
| <input type="checkbox"/> | Check for confirmation of interrupting readback signal from PSSM causes a Rchback; restore operation | | |

1.6 Confirm interrupting readback signal from PSXARC90 causes a Rchback; restore operation

- | | | | |
|--------------------------|--|--|---------------------|
| | PLACE | Peers 7, 9, 11, 13, 15, 17 in Restricted Access (Mode 8) | |
| <input type="checkbox"/> | VERIFY | MCR sees Peers 7 <input type="checkbox"/> , 9 <input type="checkbox"/> , 11 <input type="checkbox"/> , 13 <input type="checkbox"/> , 15 <input type="checkbox"/> , 17 <input type="checkbox"/> is in | MODE 8 |
| <input type="checkbox"/> | VERIFY | MCR sees: PSUARC8 <input type="checkbox"/> , PSWARC20 <input type="checkbox"/> are | DISABLED |
| | REMOVE | Readback relay, K2 , for PSXARC90 in CD Inface Box for X,Y& SwM, encl 5611in 1000P | |
| <input type="checkbox"/> | VERIFY | MCR sees Div A <input type="checkbox"/> , Div B <input type="checkbox"/> | Reachback |
| <input type="checkbox"/> | VERIFY | MCR sees: PSUARC8 <input type="checkbox"/> , PSWARC20 <input type="checkbox"/> are | DISABLED |
| | REPLACE | Readback relay, K2 , for PSXARC90 in CD Inface Box for X,Y& SwM, encl 5611in 1000P | |
| | RESET | Reachback in MCR | |
| <input type="checkbox"/> | VERIFY | MCR sees Div A <input type="checkbox"/> , Div B <input type="checkbox"/> RchBack | Reachback OK |
| <input type="checkbox"/> | VERIFY | MCR sees: PSUARC8 <input type="checkbox"/> , PSWARC20 <input type="checkbox"/> are | DISABLED |
| <input type="checkbox"/> | Check for confirmation of interrupting readback signal from PSXARC90 causes a Rchback; restore operation. | | |

1.7 Confirm interrupting readback signal from PSYARC90 causes a Rchback; restore operation

- | | | |
|--|--|---------------------|
| PLACE | Peers 7, 9, 11, 13, 15, 17 in Restricted Access (Mode 8) | |
| <input type="checkbox"/> VERIFY | MCR sees Peers 7 <input type="checkbox"/>, 9 <input type="checkbox"/>, 11 <input type="checkbox"/>, 13 <input type="checkbox"/>, 15 <input type="checkbox"/>, 17 <input type="checkbox"/> is in | MODE 8 |
| <input type="checkbox"/> VERIFY | MCR sees: PSUARC8 <input type="checkbox"/>, PSWARC20 <input type="checkbox"/> are | DISABLED |
| REMOVE | Readback relay, K3, for PSYARC90 in CD Inface Box for X,Y& SwM, encl 5611in 1000P | |
| <input type="checkbox"/> VERIFY | MCR sees Div A <input type="checkbox"/>, Div B <input type="checkbox"/> | Reachback |
| <input type="checkbox"/> VERIFY | MCR sees: PSUARC8 <input type="checkbox"/>, PSWARC20 <input type="checkbox"/> are | DISABLED |
| REPLACE | Readback relay, K3, for PSYARC90 in CD Inface Box for X,Y& SwM, encl 5611in 1000P | |
| RESET | Reachback in MCR | |
| <input type="checkbox"/> VERIFY | MCR sees Div A <input type="checkbox"/>, Div B <input type="checkbox"/> RchBack | Reachback OK |
| <input type="checkbox"/> VERIFY | MCR sees: PSUARC8 <input type="checkbox"/>, PSWARC20 <input type="checkbox"/> are | ENABLED |
| <input type="checkbox"/> | Check for confirmation of interrupting readback signal from PSYARC90 causes a Rchback; restore operation | |

1.8 Confirm normal operation of Primary & Rchback Beam Stops in Mode 24

- | | | |
|--|---|-----------------|
| PLACE | Peers 5 in Controlled Access (Mode16) | |
| <input type="checkbox"/> VERIFY | MCR sees Peers 5 is in | MODE 16 |
| SWEEP | Zones: W, X & Y | |
| <input type="checkbox"/> VERIFY | Zones: W, X & Y are | SWEEP OK |
| <input type="checkbox"/> VERIFY | 4 ea #12 Inj CA keys and 2 ea #13 Inj Sweep keys are | CAPTURED |
| PLACE | Peer 5 in No Access (Mode 24) | |
| <input type="checkbox"/> VERIFY | Peer 5 is in | MODE 24 |
| <input type="checkbox"/> VERIFY | MCR sees PSUARC8 | ENABLED |
| <input type="checkbox"/> VERIFY | MCR sees PSWARC20 | ENABLED |
| PLACE | Peers 7, 9, 11, 13, 15, 17 in Controlled Access (Mode 16) | |
| <input type="checkbox"/> VERIFY | MCR sees Peers 7 <input type="checkbox"/>, 9 <input type="checkbox"/>, 11 <input type="checkbox"/>, 13 <input type="checkbox"/>, 15 <input type="checkbox"/>, 17 <input type="checkbox"/> in | MODE 16 |
| SWEEP | All RHIC Zones | |
| <input type="checkbox"/> VERIFY | All RHIC Zones are | SWEEP OK |
| <input type="checkbox"/> VERIFY | 24 ea #14 RHIC CA keys & 6 ea #15 RHIC Sweep keys are | CAPTURED |
| <input type="checkbox"/> VERIFY | 3 ea #10 RF CA keys and 2 ea #15 RF Sweep keys are | CAPTURED |
| PLACE | Peer 7, 9, 11, 13, 15, 17 in No Access (Mode 24) | |
| <input type="checkbox"/> VERIFY | MCR sees Peers 7 <input type="checkbox"/>, 9 <input type="checkbox"/>, 11 <input type="checkbox"/>, 13 <input type="checkbox"/>, 15 <input type="checkbox"/>, 17 <input type="checkbox"/> in | MODE 24 |
| <input type="checkbox"/> VERIFY | MCR sees Primary Beam Stops: G1BS <input type="checkbox"/>, G2BS <input type="checkbox"/> | IN |
| <input type="checkbox"/> VERIFY | MCR sees Rchback Beam Stop: G3BS | OUT |
| <input type="checkbox"/> VERIFY | Visually through viewport Prim Beam Stop G12-bsx.1 is | IN |
| <input type="checkbox"/> VERIFY | Visually through viewport Prim Beam Stop G12-bsx.2 is | IN |
| <input type="checkbox"/> VERIFY | Visually through viewport Rchback Beam Stop G12-bsx.3 is | OUT |

- PRESS** **Beam Stop Withdraw Button** at MCR
- VERIFY** MCR sees Primary Beam Stops: **G1BS** , **G2BS** **OUT**
 - VERIFY** MCR sees Rchback Beam Stop: **G3BS** **OUT**
 - VERIFY** **Visually** through viewport Prim Beam Stop **G12-bsx.1** is **OUT**
 - VERIFY** **Visually** through viewport Prim Beam Stop **G12-bsx.2** is **OUT**
 - VERIFY** **Visually** through viewport Rchback Beam Stop **G12-bsx.3** is **OUT**

- REMOVE** Any **CA** key from the **RHIC** key tree
- VERIFY** MCR sees **Peers 7** , **9** , **11** , **13** , **15** , **17** is in **MODE 2**
 - VERIFY** MCR sees Primary Beam Stops: **G1BS** , **G2BS** **IN**
 - VERIFY** MCR sees Rchback Beam Stop: **G3BS** **OUT**
 - VERIFY** **Visually** through viewport Prim Beam Stop **G12-bsx.1** is **IN**
 - VERIFY** **Visually** through viewport Prim Beam Stop **G12-bsx.2** is **IN**
 - VERIFY** **Visually** through viewport Rchback Beam Stop **G12-bsx.3** is **OUT**

- Check for confirmation of normal operation of Primary & Rchback Beam Stops in Mode 24**

1.9 **Confirm removing readback signal from Prim Beam Stop G12-bsx.1 causes a reachback; clear reachback**

- PLACE** **Peers 7, 9, 11, 13, 15, 17** in **Restricted Access (Mode 8)**
- VERIFY** MCR sees **Peers 7** , **9** , **11** , **13** , **15** , **17** is in **MODE 8**
- PRESS & HOLD** **P/B S2A** in Bldg. 1012A CD Box
- VERIFY** MCR sees **RHIC Reachback** is **Reachback**
 - VERIFY** MCR sees Primary Beam Stops: **G1BS** , **G2BS** **IN**
 - VERIFY** MCR sees Rchback Beam Stop: **G3BS** **IN**
 - VERIFY** **Visually** through viewport Prim Beam Stop **G12-bsx.1** is **IN**
 - VERIFY** **Visually** through viewport Prim Beam Stop **G12-bsx.2** is **IN**
 - VERIFY** **Visually** through viewport Rchback Beam Stop **G12-bsx.3** is **IN**

- RELEASE** **P/B – S2A**
- RESET** **RHIC Reachback**
- VERIFY** MCR sees **RHIC Reachback** is **Reachback ok**
 - VERIFY** MCR sees Primary Beam Stops: **G1BS** , **G2BS** **IN**
 - VERIFY** MCR sees Rchback Beam Stop: **G3BS** **OUT**
 - VERIFY** **Visually** through viewport Prim Beam Stop **G12-bsx.1** is **IN**
 - VERIFY** **Visually** through viewport Prim Beam Stop **G12-bsx.2** is **IN**
 - VERIFY** **Visually** through viewport Rchback Beam Stop **G12-bsx.3** is **OUT**

- Check for Confirmation of removing readback signal from Prim Beam Stop G12-bsx.1 causes a reachback; clear reachback**

1.10 Confirm removing readback signal from Prim Beam Stop G12-bsx.2 causes a reachback; clear reachback

- | | | | |
|--------------------------|---|--|---------------------|
| <input type="checkbox"/> | PLACE | Peers 7, 9, 11, 13, 15, 17 in Restricted Access (Mode 8) | |
| <input type="checkbox"/> | VERIFY | MCR sees Peers 7 <input type="checkbox"/>, 9 <input type="checkbox"/>, 11 <input type="checkbox"/>, 13 <input type="checkbox"/>, 15 <input type="checkbox"/>, 17 <input type="checkbox"/> is in | MODE 8 |
| | PRESS & HOLD | P/B S3B in Bldg. 1012A CD Box | |
| <input type="checkbox"/> | VERIFY | MCR sees RHIC Reachback is | Reachback |
| <input type="checkbox"/> | VERIFY | MCR sees W Reachback is | Reachback |
| <input type="checkbox"/> | VERIFY | MCR sees Primary Beam Stops: G1BS <input type="checkbox"/>, G2BS <input type="checkbox"/> | IN |
| <input type="checkbox"/> | VERIFY | MCR sees Rchback Beam Stop: G3BS | IN |
| <input type="checkbox"/> | VERIFY | Visually through viewport Prim Beam Stop G12-bsx.2 is | IN |
| <input type="checkbox"/> | VERIFY | Visually through viewport Prim Beam Stop G12-bsx.2 is | IN |
| <input type="checkbox"/> | VERIFY | Visually through viewport Rchback Beam Stop G12-bsx.3 is | IN |
| | RELEASE | P/B S3B in Bldg. 1012A CD Box | |
| | RESET | RHIC and W Reachbacks | |
| <input type="checkbox"/> | VERIFY | MCR sees RHIC <input type="checkbox"/> and W <input type="checkbox"/> Reachback are | Reachback ok |
| <input type="checkbox"/> | VERIFY | MCR sees Primary Beam Stops: G1BS <input type="checkbox"/>, G2BS <input type="checkbox"/> | IN |
| <input type="checkbox"/> | VERIFY | MCR sees Rchback Beam Stop: G3BS | OUT |
| <input type="checkbox"/> | VERIFY | Visually through viewport Prim Beam Stop G12-bsx.2 is | IN |
| <input type="checkbox"/> | VERIFY | Visually through viewport Prim Beam Stop G12-bsx.2 is | IN |
| <input type="checkbox"/> | VERIFY | Visually through viewport Rchback Beam Stop G12-bsx.3 is | OUT |
| <input type="checkbox"/> | Check for Confirmation of removing readback signal from Prim Beam Stop G12-bsx.2 causes a reachback; clear reachback | | |

1.11 Confirm in Mode 24 removal of 24VDC from Block A1 in CD Box at 1012A drops the peer to Mode 2, disables: Rhic CDs, Rhic Ijn CDs, Permit Link and causes a NG CDEVRIO

- PLACE** Peer 13 in No Access (Mode 24)
- VERIFY** Peer 13 is in **MODE 24**

- WAIT** For **Beam Imminent Alarms** to **stop** sounding

- PRESS** **RHIC Primary Beam Stop withdraw** button in **MCR**

- VERIFY** MCR sees Primary Beam Stop: **G1BS: Div A** , **Div B** **OUT**
- VERIFY** MCR sees Primary Beam Stop: **G2BS: Div A** , **Div B** **OUT**
- VERIFY** MCR sees **PSSWM** **ENABLED**
- VERIFY** MCR sees **PSXARC90** **ENABLED**
- VERIFY** MCR sees **PSYARC90** **ENABLED**
- VERIFY** MCR sees **Peer 13 Permit Link: Div A** , **Div B** **ENABLED**

- PRESS & HOLD** P/B S1A in Bldg. 1012A CD Box

- VERIFY** MCR sees at **Ijn Hw CDev RIO: Div A** **NG Hw**
- VERIFY** **Peer 13 Div A** is in **MODE 2**

- VERIFY** MCR sees Primary Beam Stop: **G1BS** **A ≠ B**
- VERIFY** MCR sees Primary Beam Stop: **G2BS** **A ≠ B**
- VERIFY** MCR sees **PSSWM** **DISABLED**
- VERIFY** MCR sees **PSXARC90** **DISABLED**
- VERIFY** MCR sees **PSYARC90** **DISABLED**
- VERIFY** MCR sees **Peer 13 Permit Link: Div A** & **Div B** **DISABLED**
- VERIFY** MCR sees **W** & **Rhic** **Reachback** **Reachback**
- VERIFY** MCR sees **G3 BS** **IN**

- RELEASE** P/B S1A
- RESET** NG CDev RIO
- VERIFY** MCR sees at **Ijn Hw CDev RIO: Div A** **OK**
- RESET** **W & Rhic Reachbacks**
- VERIFY** MCR sees **W** & **Rhic** **Reachback** **OK**

- Check for confirmation of Mode 24 removal of 24VDC from Block A1 in cd Box at 1012A, drops the peer to Mode 2, disables: Rhic CDs, Rhic Ijn CDs, Permit Link and causes a NG CDev RIO**

1.12 Confirm in Mode 24 removal of Remote I/O cable from Scanner Module in Peer 13A in 1012A, drops the peer to Mode 2, disables: Rhic CDs, Rhic Ijn CDs, Permit Link and causes a NG CDEVRIO

- PLACE** Peer 13 in No Access (Mode 24)
- VERIFY** Peer 13 is in **MODE 24**

- WAIT** For **Beam Imminent Alarms** to **stop** sounding

- PRESS** **RHIC Primary Beam Stop withdraw** button in **MCR**

- VERIFY** MCR sees Primary Beam Stop: **G1BS: Div A** , **Div B** **OUT**
- VERIFY** MCR sees Primary Beam Stop: **G2BS: Div A** , **Div B** **OUT**

- VERIFY** MCR sees **PSSWM** **ENABLED**
- VERIFY** MCR sees **PSXARC90** **ENABLED**
- VERIFY** MCR sees **PSYARC90** **ENABLED**
- VERIFY** MCR sees **Peer 13 Permit Link: Div A & Div B** **ENABLED**

UNPLUG Remote I/O cable from Scanner module Peer 13A

- VERIFY** MCR sees at **Ijn Hw CDev RIO: Div A** **NG Hw**
- VERIFY** **Peer 13 Div A** is in **MODE 2**
- VERIFY** MCR sees Primary Beam Stop: **G1BS** **A ≠ B**
- VERIFY** MCR sees Primary Beam Stop: **G2BS** **A ≠ B**
- VERIFY** MCR sees **PSSWM** **DISABLED**
- VERIFY** MCR sees **PSXARC90** **DISABLED**
- VERIFY** MCR sees **PSYARC90** **DISABLED**
- VERIFY** MCR sees **Peer 13 Permit Link: Div A & Div B** **DISABLED**
- VERIFY** MCR sees **W Reachback** **Reachback**

REPLACE Remote I/O cable in Scanner module Peer 13A

RESET NG CDev RIO

- VERIFY** MCR sees at **Ijn Hw CDev RIO: Div A** **OK**
- RESET** **W Reachback**
- VERIFY** MCR sees **W Reachback** **OK**

- Check for confirmation in Mode 24 removal of Remote I/O cable from Scanner Module in Peer 13A in 1012A, drops the peer to Mode 2, disables: Rhic CDs, Rhic Ijn CDs, Permit Link and causes a CDev RIO**

1.13 Confirm in Mode 24 removal of 24VDC from Block B1 in CD Box at 1012A drops the peer to Mode 2, disables: Rhic CDs, Rhic Ijn CDs, Permit Link and causes a NG CDev RIO

- PLACE** Peer 13 in No Access (Mode 24)
- VERIFY** Peer 13 is in **MODE 24**

WAIT For **Beam Imminent Alarms** to stop sounding

PRESS **RHIC Primary Beam Stop withdraw** button in MCR

- VERIFY** MCR sees Primary Beam Stop: **G1BS: Div A , Div B** **OUT**
- VERIFY** MCR sees Primary Beam Stop: **G2BS: Div A , Div B** **OUT**
- VERIFY** MCR sees **PSSWM** **ENABLED**
- VERIFY** MCR sees **PSXARC90** **ENABLED**
- VERIFY** MCR sees **PSYARC90** **ENABLED**
- VERIFY** MCR sees **RHIC Permit Link: Div A & Div B** **ENABLED**

PRESS & HOLD P/B S1B in Bldg. 1012A CD Box

- VERIFY** MCR sees at **Ijn Hw CDev RIO: Div B** **NG Hw**
- VERIFY** **Peer 13 Div B & Div A** are in **MODE 2**
- VERIFY** MCR sees Primary Beam Stop: **G1BS** **A ≠ B**
- VERIFY** MCR sees Primary Beam Stop: **G2BS** **A ≠ B**
- VERIFY** MCR sees **PSSWM** **DISABLED**
- VERIFY** MCR sees **PSXARC90** **DISABLED**

- VERIFY** MCR sees **PSYARC90** **DISABLED**
- VERIFY** MCR sees **RHIC Permit Link: Div B** **DISABLED**
- VERIFY** MCR sees **W □ & Rhic □ Reachback** **Reachback**

- RELEASE** **P/B S1B**
- RESET** **NG CDev RIO**
- VERIFY** MCR sees at **Ijn Hw CDev RIO: Div A** **OK**
- RESET** **W & Rhic Reachbacks**
- VERIFY** MCR sees **W □ & Rhic □ Reachback** **OK**

- Check for confirmation of Mode 24 removal of 24VDC from Block B1 in CD Box at 1012A, drops the peer to Mode 2, disables: Rhic CDs, Rhic Ijn CDs, Permit Link and causes a NG CDev RIO**

1.14 Confirm in Mode 24 removal of Remote I/O cable from Scanner Module in Peer 13B in 1012A, drops the peer to Mode 2, disables: Rhic CDs, Rhic Ijn CDs, Permit Link and causes a NG CDev RIO

- PLACE** **Peer 13 in No Access (Mode 24)**
- VERIFY** **Peer 13 is in** **MODE 24**

- WAIT** **For Beam Imminent Alarms to stop sounding**

- PRESS** **RHIC Primary Beam Stop withdraw button in MCR**

- VERIFY** MCR sees Primary Beam Stop: **G1BS: Div A □, Div B □** **OUT**
- VERIFY** MCR sees Primary Beam Stop: **G2BS: Div A □, Div B □** **OUT**
- VERIFY** MCR sees **PSSWM** **ENABLED**
- VERIFY** MCR sees **PSXARC90** **ENABLED**
- VERIFY** MCR sees **PSYARC90** **ENABLED**
- VERIFY** MCR sees **RHIC Permit Link: Div A □ & Div B □** **ENABLED**

- UNPLUG** **Remote I/O cable from Scanner module Peer 13B**

- VERIFY** MCR sees at **Ijn Hw CDev RIO: Div B** **NG Hw**
- VERIFY** **Peer 13 Div A □ & Div B □ are in** **MODE 2**

- VERIFY** MCR sees Primary Beam Stop: **G1BS** **A ≠ B**
- VERIFY** MCR sees Primary Beam Stop: **G2BS** **A ≠ B**
- VERIFY** MCR sees **PSSWM** **DISABLED**
- VERIFY** MCR sees **PSXARC90** **DISABLED**
- VERIFY** MCR sees **PSYARC90** **DISABLED**
- VERIFY** MCR sees **RHIC Permit Link: Div A □ & Div B □** **DISABLED**
- VERIFY** MCR sees **W □ & Rhic □ Reachback** **Reachback**

- REPLACE** **Remote I/O cable in Scanner module Peer 13B**
- RESET** **NG CDev RIO**
- VERIFY** MCR sees at **Ijn Hw CDev RIO: Div A** **OK**
- RESET** **W & Rhic Reachbacks**
- VERIFY** MCR sees **W □ & Rhic □ Reachback** **OK**

- Check for confirmation in Mode 24 removal of Remote I/O cable from Scanner Module in Peer 13B in 1012A, drops the peer to Mode 2, disables: Rhic CDs, Rhic Ijn CDs, Permit Link and causes a NG CDev RIO**

1.15 Confirm Remote Reset function of the RF Key Tree from MCR

- VERIFY** RF Transfer key is in MCR and is **CAPTURED**
- PLACE** Peer 9 in Safe Access (Mode 2)
- VERIFY** MCR sees Peer 9 is in **MODE 2**
- VERIFY** 6 ea #10 RF CA keys & 2 ea #11 RF Sweep keys are **CAPTURED**
- VERIFY** RF Key Tree Complete indicator is **ON**
- VERIFY** RF Reset indicator is **OFF**
- REMOVE** The last #11 Sweep Key
- VERIFY** RF Key Tree Complete indicator is **OFF**
- VERIFY** RF Reset indicator is **OFF**
- CAPTURE** The last #11 Sweep Key
- VERIFY** RF Key Tree Complete indicator is **OFF**
- VERIFY** RF Reset indicator is **ON**
- VERIFY** Attempt to reset gate 4GE2 **FAIL**
- PLACE** Peer 9 in Restricted Access (Mode 8)
- VERIFY** MCR sees Peer 9 is in **MODE 8**
- VERIFY** Attempt to reset gate 4GE2 **FAIL**
- PLACE** Peer 9 in Controlled Access (Mode 16)
- VERIFY** MCR sees Peer 9 is in **MODE 16**
- VERIFY** Attempt to reset gate 4GE2 is **SUCCESSFUL**
- Check for confirmation of Remote Reset function of the RF Key Tree from MCR

1.16 Confirm normal move to MODE 24 and MODE 26 is possible.

- PLACE** Peer 9 in Controlled Access (Mode 16)
- VERIFY** MCR sees Peer 9 is in **MODE 16**
- CLOSE** Gate 5GS1
- RESET** Gates: 3GI1, 3EL1, 4MD1, 4GE1, 4MD2, 4GE2, 4GI1, 4EL1, 4GE3, 4ED1
- VERIFY** Gates: 3GI1 , 3EL1 , 4MD1 , 4GE1 , 4MD2 , 4GE2 , 4GI1 , 4EL1 , 4GE3 , 4ED1 are **RESET**
- SWEEP** Zones: 4Z1, 4Z2
- VERIFY** Zones: 4Z1 , 4Z2 are **SWEPT**
- VERIFY** 6 ea #10 RF CA keys and 2 ea #11 RF Sweep keys are **CAPTURED**
- VERIFY** RF Key Tree Complete indicator is **ON**
- VERIFY** RF Reset indicator is **OFF**
- VERIFY** Attempt to place Peer 9 in No Access (Mode 24) is **SUCCESSFUL**
- PLACE** Peer 9 in Controlled Access (Mode 16)
- VERIFY** MCR sees Peer 9 is in **MODE 16**
- VERIFY** Attempt to place Peer 9 in RF No Access (Mode 26) is **SUCCESSFUL**
- PLACE** Peer 9 in Controlled Access (Mode 16)
- VERIFY** MCR sees Peer 9 is in **MODE 16**
- Check for confirmation of normal move to MODE 24 and MODE 26 is possible.

1.17 Confirm RF Key Tree complete is necessary for move to MODE 24 or MODE 26

- PLACE** Peer 9 in Controlled Access (Mode 16)
 VERIFY MCR sees Peer 9 is in **MODE 16**
FOLLOW Table 1 below

Key	Turn Key to OFF position	Verify Key Active light ON	Verify Reset light OFF	Verify Key Tree Complete Light OFF	Verify cannot go into Mode 24	Verify cannot go into Mode 26	Turn Key to ON position
RF CA #1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
RF CA #2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
RF CA #3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
RF Sweep #1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
RF Sweep #2		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Table – 1: Test of RF Key Tree Complete is necessary for move to Mode 24 or Mode 26

- Check for confirmation of RF Key Tree complete is necessary for move to MODE 24 or MODE 26

1.18 Confirm in Mode 24 removal of key from RF Key Tree will drop Peer 9 to Mode 2

- PLACE** Peer 9 in No Access (Mode 24)
 VERIFY MCR sees Peer 9 in **MODE 24**
FOLLOW Table 2 below

	Peer 9 to Mode 24	Turn key OFF	Verify Key Active light ON	Verify Key Tree Complete Light OFF	Verify Peer 9 moved to Mode 2	Turn key ON	Verify Key Active light OFF	Verify Key Tree Complete Light ON
RF CA #1			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
RF CA #2			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
RF CA #3			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
RF Sweep #1			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
RF Sweep #2			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>

Table - 1: In Mod 24 test of removal of key from RF Key Tree

- Check for confirmation in Mode 24 removal of key from RF Key Tree will drop Peer 9 to Mode 2

1.19 Confirm in Mode 26 removal of key from RF Key Tree will drop Peer 9 to Mode 2

- PLACE** Peer 9 in RF No Access (Mode 26)
- VERIFY** MCR sees Peer 9 in **MODE 26**
- FOLLOW** Table 3 below

	Peer 9 to Mode 26	Turn key OFF	Verify Key Active light ON	Verify Key Tree Complete Light OFF	Verify Peer 9 moved to Mode 2	Turn key ON	Verify Key Active light OFF	Verify Key Tree Complete Light ON
RF CA #1			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
RF CA #2			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
RF CA #3			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
RF Sweep #1			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
RF Sweep #2			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>

Table - 1 In Mode 26 test of removal of key from RF Key Tree

- Check for confirmation in Mode 26 removal of key from RF Key Tree will drop Peer 9 to Mode 2

1.20 Confirm Excess #11 RF Sweep key at MCR will drop Peer 9 from Mode 24 to Mode 2

- PLACE** Peer 9 in No Access (Mode 24)
- VERIFY** MCR sees Peer 9 in **MODE 24**
- VERIFY** RF Key Tree Complete indicator is **ON**
- VERIFY** RF Reset indicator is **OFF**

- ATTEMPT** To turn excess #11 RF Sweep key in Reset tumbler at MCR
- VERIFY** MCR sees Peer 9 moved to **MODE 2**
- REMOVE** Excess #11 RF Sweep key from Reset tumbler

- Check for confirmation of excess #11 RF Sweep key at MCR will drop Peer 9 from Mode 24 to Mode 2

1.21 Confirm Excess #11 RF Sweep key at MCR will drop Peer 9 from Mode 26 to Mode 2

- PLACE** Peer 9 in No Access (Mode 26)
- VERIFY** MCR sees Peer 9 in **MODE 26**
- VERIFY** RF Key Tree Complete indicator is **ON**
- VERIFY** RF Reset indicator is **OFF**

- ATTEMPT** To turn excess #11 RF Sweep key in Reset tumbler at MCR
- VERIFY** MCR sees Peer 9 moved to **MODE 2**
- REMOVE** Excess #11 RF Sweep key from Reset tumbler

- Check for confirmation of excess #11 RF Sweep key at MCR will drop Peer 9 from Mode 26 to Mode 2

1.22 Confirm keyswitch integrity of keys in RF Key Tree in Mode 8

- PLACE** All Peer s in Restricted Access (Mode 8)
- VERIFY** MCR sees Peers: 5 , 7 , 9 , 11 , 13 , 15 , 17 in **MODE 8**
- FOLLOW** Table 4 below

Key	Verify All Peers in Mode 8	Turn key OFF	Verify Key Active light ON	Verify Key Tree Complete light OFF	Verify all Peers remain in Mode 8	Turn key ON	Verify Key Active light OFF	Verify Key Tree Complete light ON	Next key
RF CA #1	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
RF CA #2	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
RF CA #3	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
RF CA #4	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
RF CA #5	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
RF CA #6	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
RF Sweep #1	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
RF Sweep #2	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	End of test

Table - 1 Test in Mode 8 of keyswitch integrity of keys in RF Key Tree

- Check for acceptance of Confirm keyswitch integrity of keys in RF Key Tree in Mode 8

1.23 Confirm Remote Reset function of the RHIC Key Tree from MCR

- VERIFY** **RF Transfer key is in MCR and is** **CAPTURED**

- VERIFY** 24 ea #14 RHIC CA keys & 6 ea #15 RHIC Sweep keys are **CAPTURED**
- VERIFY** **RHIC Key Tree Complete** indicator is **ON**
- VERIFY** **RHIC Reset** indicator is **OFF**

- REMOVE** The last #15 Sweep Key
- VERIFY** **RHIC Key Tree Complete** indicator is **OFF**
- VERIFY** **RHIC Reset** indicator is **OFF**

- CAPTURE** The last #15 Sweep Key
- VERIFY** **RHIC Key Tree Complete** indicator is **OFF**
- VERIFY** **RHIC Reset** indicator is **ON**

- PLACE** **Peers 7, 9, 11, 13, 15, 17 in Safe Access (Mode 2)**
- VERIFY** MCR sees Peers 7 , 9 , 11 , 13 , 15 , 17 is in **MODE 2**
- VERIFY** Attempt to reset gates: 12GE1 , 2GE1 , 4GE2 , 6GE1 ,
8GE2 , 10GE1 **FAIL**

- PLACE** **Peers 7, 9, 11, 13, 15, 17 in Restricted Access (Mode8)**
- VERIFY** MCR sees Peers 7 , 9 , 11 , 13 , 15 , 17 is in **MODE 8**
- VERIFY** Attempt to reset gates: 11GS1 , 2GE2 , 4GE3 , 6GE2 ,
7GE1 , 10GI1 **FAIL**

- PLACE** **Peers 7, 9, 11, 13, 15, 17 in Controlled Access (Mode16)**
- VERIFY** MCR sees Peers 7 , 9 , 11 , 13 , 15 , 17 is in **MODE 16**
- VERIFY** Attempt to reset gates in Table – 1, below **SUCCESSFUL**

Gate	Verify reset O.K. in Mode 16	Gate	Verify reset O.K. in Mode 16	Gate	Verify reset O.K. in Mode 16	Gate	Verify reset O.K. in Mode 16
11GS1	<input type="checkbox"/>	2GE1	<input type="checkbox"/>	6GE2	<input type="checkbox"/>	9GI1	<input type="checkbox"/>
11GI1	<input type="checkbox"/>	2GE2	<input type="checkbox"/>	6GE3	<input type="checkbox"/>	10GE1	<input type="checkbox"/>
12GE1	<input type="checkbox"/>	4GE3	<input type="checkbox"/>	7GS1	<input type="checkbox"/>	10GI1	<input type="checkbox"/>
12GI1	<input type="checkbox"/>	5GS1	<input type="checkbox"/>	7GE1	<input type="checkbox"/>	XXXX	<u>XXXXXX</u>
1GS1	<input type="checkbox"/>	5GE1	<input type="checkbox"/>	8GE2	<input type="checkbox"/>	XXXX	<u>XXXXXX</u>
1GI1	<input type="checkbox"/>	6GE1	<input type="checkbox"/>	9GS1	<input type="checkbox"/>	XXXX	<u>XXXXXX</u>

Table – 1: Test of the Remote Reset function from the RHIC Key tree in MCR

- Check for confirmation of Remote Reset function of the RHIC Key Tree from MCR**

1.24 Confirm normal move to MODE 24 is possible.

- PLACE** Peers 7, 9, 11, 13, 15, 17 in Controlled Access (Mode16)
- VERIFY** MCR sees Peers 7 , 9 , 11 , 13 , 15 , 17 is in **MODE 16**

- VERIFY** **All gates are** **RESET**
- VERIFY** **All Zones are** **SWEPT**
- VERIFY** 24 ea #14 RHIC CA keys & 6 ea #15 RHIC Sweep keys are **CAPTURED**
- VERIFY** **RHIC Key Tree Complete** indicator is **ON**
- VERIFY** **RHIC Reset** indicator is **OFF**
- VERIFY** 6 ea #10 RF CA keys and 2 ea #11 RF Sweep keys are **CAPTURED**
- VERIFY** **RF Key Tree Complete** indicator is **ON**
- VERIFY** **RF Reset** indicator is **OFF**

- VERIFY** Attempt to place **Peer 7, 9, 11, 13, 15, 17 No Access (Mode 24)** is **SUCCESSFUL**

- PLACE** Peer 7, 9, 11, 13, 15, 17 in Controlled Access (Mode 16)
- VERIFY** MCR sees Peer 7 , 9 , 11 , 13 , 15 , 17 in **MODE 16**

- Check for confirmation of normal move to MODE 24 is possible.**

1.25 Confirm RHIC Key Tree complete is necessary for move to MODE 24

- PLACE** Peer 7, 9, 11, 13, 15, 17 in Controlled Access (Mode 16)
- VERIFY** MCR sees Peer 7 , 9 , 11 , 13 , 15 , 17 in **MODE 16**
- FOLLOW** Table 2 below

Key	Turn Key to OFF position	Verify Key Active light ON	Verify Reset light OFF	Verify Key Tree Complete Light OFF	Verify cannot go into Mode 24	Turn Key to ON position
1 st Row -RHIC CA #1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1 st Row -RHIC CA #3		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2 nd Row -RHIC CA #8		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2 nd Row -RHIC CA #12		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3 rd Row -RHIC CA #15		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3 rd Row -RHIC CA #17		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4 th Row -RHIC CA #22		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4 th Row -RHIC CA #23		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
RHIC Sweep #1		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
RHIC Sweep #6		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Table – 1: Test of RHIC Key Tree Complete is necessary for move to Mode 24

- Check for confirmation of RHIC Key Tree complete is necessary for move to MODE 24**

1.26 Confirm in Mode 24 removal of key from Key Tree will drop System to Mode 2

- PLACE** Peer 7, 9, 11, 13, 15, 17 in No Access (Mode 24)
 VERIFY MCR sees Peer 7 , 9 , 11 , 13 , 15 , 17 in **MODE 24**
FOLLOW Table 3 below

Key	All Peers to Mode 24	Turn key OFF	Verify Key Active light ON	Verify Key Tree Complete Light OFF	Verify all Peers moved to Mode 2	Turn key ON	Verify Key Active light OFF	Verify Key Tree Complete Light ON
1 st Row -RHIC CA #2			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
1 st Row -RHIC CA #4			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
2 nd Row -RHIC CA #7			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
2 nd Row -RHIC CA #10			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
3 rd Row -RHIC CA #13			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
3 rd Row -RHIC CA #18			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
4 th Row -RHIC CA #20			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
4 th Row -RHIC CA #21			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
RHIC Sweep #2			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
RHIC Sweep #5			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
RF CA # 2			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
RF Sweep #1			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>

Table - 1: Test in Mode 24 of removal of key from Key Tree will drop System to Mode 2

- Check for confirmation in Mode 24 removal of key from Key Tree will drop System to Mode 2**

1.27 Confirm Excess #15 RHIC Sweep key at MCR will drop System from Mode 24 to Mode 2

- VERIFY** 24 ea #14 RHIC CA keys & 6 ea #15 RHIC Sweep keys are **CAPTURED**
- PLACE** Peer 7, 9, 11, 13, 15, 17 in No Access (Mode 24)
- VERIFY** MCR sees Peer 7 □, 9 □, 11 □, 13 □, 15 □, 17 □ in **MODE 24**

- VERIFY** **RHIC Key Tree Complete** indicator is **ON**
- VERIFY** **RHIC Reset** indicator is **OFF**

- ATTEMPT** To turn excess #15 RHIC Sweep key in Reset tumbler at MCR

- VERIFY** MCR sees All Peers moved to **MODE 2**
- REMOVE** Excess #15 RHIC Sweep key from Reset tumbler

- Check for confirmation of excess #15 RHIC Sweep at MCR key will drop System from Mode 24 to Mode 2**

1.28 Confirm Excess #11 RF Sweep key at MCR will drop System from Mode 24 to Mode 2

- VERIFY** 24 ea #14 RHIC CA keys & 6 ea #15 RHIC Sweep keys are **CAPTURED**
- PLACE** Peer 7, 9, 11, 13, 15, 17 in No Access (Mode 24)
- VERIFY** MCR sees Peer 7 □, 9 □, 11 □, 13 □, 15 □, 17 □ in **MODE 24**

- VERIFY** **RHIC Key Tree Complete** indicator is **ON**
- VERIFY** **RHIC Reset** indicator is **OFF**

- ATTEMPT** To turn excess #11 RF Sweep key in RF Reset tumbler at MCR

- VERIFY** MCR sees All Peers moved to **MODE 2**
- REMOVE** Excess #11 RHIC Sweep key from Reset tumbler

- Check for confirmation of excess #11 RF Sweep key at MCR will drop System from Mode 24 to Mode 2**

1.29 Confirm keyswitch integrity of keys in Rhic Key Tree in Mode 8

- PLACE** Peer 7, 9, 11, 13, 15, 17 in Restricted Access (Mode 8)
- VERIFY** MCR sees Peer 7 □, 9 □, 11 □, 13 □, 15 □, 17 □ in **MODE 8**
- FOLLOW** Table 4 below

Key	Verify all Peers in Mode 8	Turn key OFF	Verify Key Active light ON	Verify Key Tree Complete light OFF	Verify all Peers remain in Mode 8	Turn key ON	Verify Key Active light OFF	Verify Key Tree Complete Light ON	Go to next key
1 st Row -RHIC CA #1	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
1 st Row -RHIC CA #2	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
1 st Row -RHIC CA #3	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
1 st Row -RHIC CA #4	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
1 st Row -RHIC CA #5	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
1 st Row -RHIC CA #6	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
2 nd Row -RHIC CA #7	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
2 nd Row -RHIC CA #8	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
2 nd Row -RHIC CA #9	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
2 nd Row -RHIC CA #10	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
2 nd Row -RHIC CA #11	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
2 nd Row -RHIC CA #12	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
3 rd Row -RHIC CA #13	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
3 rd Row -RHIC CA #14	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
3 rd Row -RHIC CA #15	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
3 rd Row -RHIC CA #16	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
3 rd Row -RHIC CA #17	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
3 rd Row -RHIC CA #18	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
4 th Row -RHIC CA #19	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
4 th Row -RHIC CA #20	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
4 th Row -RHIC CA #21	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
4 th Row -RHIC CA #22	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
4 th Row -RHIC CA #23	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
4 th Row -RHIC CA #24	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
RHIC Sweep #1	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
RHIC Sweep #2	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
RHIC Sweep #3	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
RHIC Sweep #4	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
RHIC Sweep #5	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	
RHIC Sweep #6	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	End of test

Table - 1: Test in Mode 8 of keyswitch integrity of keys in Rhic Key Tree

Check for acceptance of Confirm keyswitch integrity of keys in Rhic Key Tree in Mode 8

1.30 Confirm with RF Power Supply Enabled and HV turned ON Ross Relay Opens

- REMOVE**
LOTO from RF CD Switch Box
- VERIFY**
RF CD Switch Box is
NO LOTO
- VERIFY**
480 V power to each RF power supply is
OFF
- FOLLOW**
Table 1 below

RF Power Supply	Verify PS is Enabled	Turn On PS Control Power	Turn On Ps HV	Verify Ross relay opens
Y04 – CAVA 3.1	<input type="checkbox"/>			<input type="checkbox"/>
Y04 – CAVA 3.2	<input type="checkbox"/>			<input type="checkbox"/>
B14 – CAVA 3.1	<input type="checkbox"/>			<input type="checkbox"/>
B14 – CAVA 3.2	<input type="checkbox"/>			<input type="checkbox"/>
Y04 – CAVS 3.1	<input type="checkbox"/>			<input type="checkbox"/>
Y04 – CAVS 3.2	<input type="checkbox"/>			<input type="checkbox"/>
Y04 – CAVS 3.3	<input type="checkbox"/>			<input type="checkbox"/>
B14 – CAVS 3.1	<input type="checkbox"/>			<input type="checkbox"/>
<u>B14 – CAVS 3.2</u>	<input type="checkbox"/>			<input type="checkbox"/>
B14 – CAVS 3.3	<input type="checkbox"/>			<input type="checkbox"/>
G4 – CAVSX 1	<input type="checkbox"/>			<input type="checkbox"/>
<u>G4 – CAVSX 2</u>	<input type="checkbox"/>			<input type="checkbox"/>
G4 – CAVSX 3	<input type="checkbox"/>			<input type="checkbox"/>
G4 – CAVSX 4	<input type="checkbox"/>			<input type="checkbox"/>

Table – 1: Test of Ross relay with RF Power supply enabled and HV turned ON

- Check for confirmation with RF Power Supply enabled and HV turned ON Ross relay opens.**

1.31 Confirm removing an RF Key disables the RF Critical Devices at HV in Mode 24

- SWEEP Zone 4Z1 using MCR or RF personnel
- VERIFY Zone 4Z1 is SWEEP OK

- VERIFY RF CD Switch Box is NO LOTO

- PLACE Peer 9 in NO Access (Mode 24)
- VERIFY MCR sees Peer 9 is in MODE 24

- VERIFY MCR sees on Summary Page CD1: A Div , B Div ENABLED
- VERIFY MCR sees on Summary Page CD2: A Div , B Div ENABLED
- VERIFY In RF Crit. Dev. Encl. 1004A A1 outputs: 0 =CD1 & 1 = CD2 are ON
- VERIFY In RF Crit. Dev. Encl. 1004A B1 outputs: 0 =CD1 & 1 = CD2 are ON

- TURN ON HV for RF Power Supplies: Y04-CAVA 3.1, B14-CAVA3.1, Y04-CAVS 3.1, B14-CAVS 3.1
- VERIFY HV for RF Power Supplies: Y04-CAVA 3.1 , B14-AVA3.1 , Y04-CAVS 3.1 , B14-CAVS 3.1 ON

- REMOVE Key from RF Key Tree
- VERIFY HV for RF Power Supplies: Y04-CAVA 3.1 , B14-AVA3.1 , Y04-CAVS 3.1 , B14-CAVS 3.1 SAFE
- VERIFY MCR sees Peer 9 is in MODE 2
- VERIFY MCR sees on Summary Page CD1: A Div , B Div SAFE
- VERIFY MCR sees on Summary Page CD2: A Div , B Div SAFE
- VERIFY In RF Crit. Dev. Encl. 1004A A1 outputs: 0 =CD1 & 1 = CD2 are OFF
- VERIFY In RF Crit. Dev. Encl. 1004A B1 outputs: 0 =CD1 & 1 = CD2 are OFF

- Check for confirmation of removing an RF key disables the RF Critical Devices at HV in Mode 24

1.32 Confirm opening a gate in Zone 4Z2 disables the RF Critical Devices at HV in Mode 24

- VERIFY RF CD Switch Box is NO LOTO
- STATION Tester inside Gate 4GE3

- PLACE Peer 9 in NO Access (Mode 24)
- VERIFY MCR sees Peer 9 is in MODE 24

- VERIFY MCR sees on Summary Page CD1: A Div , B Div ENABLED
- VERIFY MCR sees on Summary Page CD2: A Div , B Div ENABLED
- VERIFY In RF Crit. Dev. Encl. 1004A A1 outputs: 0 =CD1 & 1 = CD2 are ON
- VERIFY In RF Crit. Dev. Encl. 1004A B1 outputs: 0 =CD1 & 1 = CD2 are ON

- TURN ON HV for RF Power Supplies: Y04-CAVA 3.2, B14-CAVA3.2, Y04-CAVS 3.2, B14-CAVS 3.2
- VERIFY HV for RF Power Supplies: Y04-CAVA 3.2 , B14-CAVA3.2 , Y04-CAVS 3.2 , B14-CAVS 3.2 ON

- OPEN Gate 4GE3
- VERIFY HV for RF Power Supplies: Y04-CAVA 3.2 , B14-CAVA3.2 , Y04-CAVS 3.2 , B14-CAVS 3.2 SAFE

- VERIFY** **MCR sees Peer 9** is in **MOD E 2**
- VERIFY** **Zone 4Z1** is **NO SWE EP**
- VERIFY** **MCR sees on Summary Page CD1: A Div** , **B Div** **SAFE**
- VERIFY** **MCR sees on Summary Page CD2: A Div** , **B Div** **SAFE**
- VERIFY** **In RF Crit. Dev. Encl. 1004A A1 outputs: 0 =CD1 & 1 = CD2** are **OFF**
- VERIFY** **In RF Crit. Dev. Encl. 1004A B1 outputs: 0 =CD1 & 1 = CD2** are **OFF**

- Check for confirmation of opening a gate in Zone 4Z1 disables the RF Critical Devices in Mode 24**

1.33 Confirm removing an RF Key disables the RF Critical Devices at HV in Mode 26

- SWEEP** **Zone 4Z1 using MCR or RF personnel**
- VERIFY** **Zone 4Z1** is **SWEEP OK**
- PLACE** **Peer 9 in NO Access (Mode 26)**
- VERIFY** **MCR sees Peer 9** is in **MODE 26**

- VERIFY** **MCR sees on Summary Page CD1: A Div** , **B Div** **ENABLED**
- VERIFY** **MCR sees on Summary Page CD2: A Div** , **B Div** **ENABLED**
- VERIFY** **In RF Crit. Dev. Encl. 1004A A1 outputs: 0 =CD1 & 1 = CD2** are **ON**
- VERIFY** **In RF Crit. Dev. Encl. 1004A B1 outputs: 0 =CD1 & 1 = CD2** are **ON**

- TURN ON** **HV for RF Power Supplies: Y04-CAVS 3.3, B14-CAVS3.3, G4-CAVSX 1, G4-CAVSX 2**
- VERIFY** **HV for RF Power Supplies: Y04-CAVS 3.3** , **B14-CAVS 3.3** , **G4-CAVSX 1** , **G4-CAVSX 2** **ON**

- REMOVE** **Key from RF Key Tree**
- VERIFY** **HV for RF Power Supplies: Y04-CAVS 3.3** , **B14-CAVS 3.3** , **G4-CAVSX 1** , **G4-CAVSX 2** **SAFE**
- VERIFY** **MCR sees Peer 9** is in **MODE 2**
- VERIFY** **MCR sees on Summary Page CD1: A Div** , **B Div** **SAFE**
- VERIFY** **MCR sees on Summary Page CD2: A Div** , **B Div** **SAFE**
- VERIFY** **In RF Crit. Dev. Encl. 1004A A1 outputs: 0 =CD1 & 1 = CD2** are **OFF**
- VERIFY** **In RF Crit. Dev. Encl. 1004A B1 outputs: 0 =CD1 & 1 = CD2** are **OFF**

- Check for confirmation of removing an RF key disables the RF Critical Devices at HV in Mode 26**

1.34 Confirm opening a gate in Zone 4Z1 disables the RF Critical Devices at HV in Mode 26

- VERIFY RF CD Switch Box is NO LOTO**
- STATION Tester inside Gate _____**
- PLACE Peer 9 in NO Access (Mode 26)**
- VERIFY MCR sees Peer 9 is in MODE 26**
- VERIFY MCR sees on Summary Page CD1: A Div , B Div ENABLED**
- VERIFY MCR sees on Summary Page CD2: A Div , B Div ENABLED**
- VERIFY In RF Crit. Dev. Encl. 1004A A1 outputs: 0 =CD1 & 1 = CD2 are ON**
- VERIFY In RF Crit. Dev. Encl. 1004A B1 outputs: 0 =CD1 & 1 = CD2 are ON**
- TURN ON HV for RF Power Supplies: Y04-CAVS 3.1, B14-CAVS3.1, G4-CAVSX 3, G4-CAVSX 4**
- VERIFY HV for RF Power Supplies: Y04-CAVS 3.1 , B14-CAVS 3.1 , G4-CAVSX 3 , G4-CAVSX 4 ON**
- OPEN Gate _____**
- VERIFY HV for RF Power Supplies: Y04-CAVS 3.1 , B14-CAVS 3.1 , G4-CAVSX 3 , G4-CAVSX 4 SAFE**
- VERIFY MCR sees Peer 9 is in MODE 2**
- VERIFY Zone 4Z1 is NO SWEEP**
- VERIFY MCR sees on Summary Page CD1: A Div , B Div SAFE**
- VERIFY MCR sees on Summary Page CD2: A Div , B Div SAFE**
- VERIFY In RF Crit. Dev. Encl. 1004A A1 outputs: 0 =CD1 & 1 = CD2 OFF**
are
- VERIFY In RF Crit. Dev. Encl. 1004A B1 outputs: 0 =CD1 & 1 = CD2 OFF**
are
- Check for confirmation of opening a gate in Zone 4Z1 disables the RF Critical Devices at HV in Mode 26**

1.35 Confirm removal of a key from the RHIC Key Tree disables RHIC Injection Critical Devices & RHIC Critical Devices

- PLACE Peers 5, 7, 9, 11, 13, 15, 17 in No Access (Mode24)**
- VERIFY MCR sees Peers 5 , 7 , 9 , 11 , 13 , 15 , 17 is in MODE 24**
- VERIFY Permit Link is ENABLED**
- VERIFY MCR sees Magnets: PSSWM , PSXARC90 , PSYARC90 , PSUARC8 , and PSWARC20 are ENABLED**
- TURN ON MCR sees PSUARC8 to 0 Amps**
- TURN ON MCR sees PSWARC20 to 0 Amps**
- TURN ON Switching magnet PSSWM to 0 Amps**
- TURN ON X Line magnet PSXARC90 to 0 Amps**
- TURN ON Y Line magnet PSYARC90 to 0 Amps**
- TURN ON**

PRESS	RHIC Primary Beam Stop Withdraw in MCR	
<input type="checkbox"/> VERIFY	MCR sees Primary Beam Shutters: G1BS, G2BS	OUT
<input type="checkbox"/> VERIFY	MCR sees RchBack Beam Shutter: G3BS	OUT
REMOVE	Any key from RHIC Key Tree	
<input type="checkbox"/> VERIFY	RHIC Key Tree Complete is	OFF
<input type="checkbox"/> VERIFY	MCR sees Peers 7 <input type="checkbox"/>, 9 <input type="checkbox"/>, 11 <input type="checkbox"/>, 13 <input type="checkbox"/>, 15 <input type="checkbox"/>, 17 <input type="checkbox"/> are in	MODE 2
<input type="checkbox"/> VERIFY	MCR sees Switching magnet PSSWM is	DISABLED
<input type="checkbox"/> VERIFY	MCR sees X Line magnet PSXARC90 is	DISABLED
<input type="checkbox"/> VERIFY	MCR sees Y Line magnet PSYARC90 is	DISABLED
<input type="checkbox"/> VERIFY	MCR sees PSUARC8 is	ON
<input type="checkbox"/> VERIFY	MCR sees PSWARC20 is	ON
<input type="checkbox"/> VERIFY	MCR sees Primary Beam Shutters: G1BS, G2BS	IN
<input type="checkbox"/> VERIFY	MCR sees RchBack Beam Shutter: G3BS	OUT
<input type="checkbox"/> VERIFY	MCR sees Permit Link is	DISABLED
<input type="checkbox"/> VERIFY	Attempt to energize Injection Primary Critical Devices	FAIL
<input type="checkbox"/> VERIFY	Attempt to withdraw Primary Beam Shutters	FAIL
RETURN	Key to ON position	

- Check for confirmation of removal of a key from the RHIC Key Tree disables RHIC Injection Critical Devices & RHIC Critical Devices.**

1.36 Confirm normal operation of Injection RchBack CDs and Injection Primary CDs in Mode 24

PLACE	Peers 5 in Controlled Access (Mode16)	
<input type="checkbox"/> VERIFY	MCR sees Peers 5 is in	MODE 16
SWEEP	Zones: W, X & Y	
<input type="checkbox"/> VERIFY	Zones: W, X & Y are	SWEEP OK
<input type="checkbox"/> VERIFY	4 ea #12 Inj CA keys and 2 ea #13 Inj Sweep keys are	CAPTURED
PLACE	Peer 5 in No Access (Mode 24)	
<input type="checkbox"/> VERIFY	Peer 5 is in	MODE 24
<input type="checkbox"/> VERIFY	MCR sees PSUARC8	ENABLED
<input type="checkbox"/> VERIFY	MCR sees PSWARC20	ENABLED
PLACE	Peers 7, 9, 11, 13, 15, 17 in Controlled Access (Mode 16)	
<input type="checkbox"/> VERIFY	MCR sees Peers 7 <input type="checkbox"/>, 9 <input type="checkbox"/>, 11 <input type="checkbox"/>, 13 <input type="checkbox"/>, 15 <input type="checkbox"/>, 17 <input type="checkbox"/> are in	MODE 16
SWEEP	All RHIC Zones	
<input type="checkbox"/> VERIFY	All RHIC Zones are	SWEEP OK
<input type="checkbox"/> VERIFY	24 ea #14 RHIC CA keys & 6 ea #15 RHIC Sweep keys are	CAPTURED
<input type="checkbox"/> VERIFY	3 ea #10 RF CA keys and 2 ea #15 RF Sweep keys are	CAPTURED
PLACE	Peer 7, 9, 11, 13, 15, 17 in No Access (Mode 24)	
<input type="checkbox"/> VERIFY	MCR sees Peers 7 <input type="checkbox"/>, 9 <input type="checkbox"/>, 11 <input type="checkbox"/>, 13 <input type="checkbox"/>, 15 <input type="checkbox"/>, 17 <input type="checkbox"/> are in	MODE 24
<input type="checkbox"/> VERIFY	MCR sees PSSWM is	ENABLED
<input type="checkbox"/> VERIFY	MCR sees PSXARC90 is	ENABLED
<input type="checkbox"/> VERIFY	MCR sees PSYARC90 is	ENABLED

ENERGIZE Switching magnet **PSSWM** to **100 Amps**

ENERGIZE X Line magnet **PSXARC90** to **100 Amps**

ENERGIZE Y Line magnet **PSYARC90** to **100 Amps**

- VERIFY** MCR sees Magnets: **PSSWM** , **PSXARC90** , **PSYARC90** are **ENERGIZED**
- VERIFY** MCR sees **PSUARC8** **ENABLED**
- VERIFY** MCR sees **PSWARC20** **ENABLED**

- Check for confirmation of normal operation of Injection RchBack CDs and Injection CDs in Mode 24**

1.37 Confirm removal of key from RHIC key tree disables only Injn Primary CDs, not Rchback CDs

- VERIFY** MCR sees Magnets: **PSSWM** , **PSXARC90** , **PSYARC90** are **ENERGIZED**
- VERIFY** MCR sees: **PSUARC8** , **PSWARC20** are **ENABLED**

REMOVE CA key from **RHIC Key Tree**

- VERIFY** MCR sees **Peer 7, 9, 11, 13, 15, 17** is in **MODE 2**
- VERIFY** MCR sees: **PSSWM** , **PSXARC90** , **PSYARC90** are **DISABLED**
- VERIFY** **PS Pet Page** shows **PSSWM** , **PSXARC90** , **PSYARC90** are **OFF**
- VERIFY** MCR sees: **PSUARC8** , **PSWARC20** are **ENABLED**

- Check for confirmation of removal of key from RHIC key tree disables only Injn Primary CDs, not Rchback CDs**

1.38 Confirm normal operation of Injection RchBack CDs: PSUarc8 & PS Warc20 and Injection Primary CDs: PSXarc90, PSYarc90 and PSSwm at 100Amps in Mode 24

- | | | | |
|--------------------------|---|---|----------------------|
| <input type="checkbox"/> | PLACE | Peers 5 in Controlled Access (Mode16) | |
| <input type="checkbox"/> | VERIFY | MCR sees Peers 5 is in | MODE 16 |
| <input type="checkbox"/> | SWEEP | Zones: W, X & Y | |
| <input type="checkbox"/> | VERIFY | Zones: W, X & Y are | SWEEP OK |
| <input type="checkbox"/> | VERIFY | 4 ea #12 Inj CA keys and 2 ea #13 Inj Sweep keys are | CAPTURED |
| <input type="checkbox"/> | PLACE | Peer 5 in No Access (Mode 24) | |
| <input type="checkbox"/> | VERIFY | Peer 5 is in | MODE 24 |
| <input type="checkbox"/> | VERIFY | MCR sees PSUARC8 | ENABLED |
| <input type="checkbox"/> | VERIFY | MCR sees PSWARC20 | ENABLED |
| <input type="checkbox"/> | PLACE | Peers 7, 9, 11, 13, 15, 17 in Controlled Access (Mode 16) | |
| <input type="checkbox"/> | VERIFY | MCR sees Peers 7 <input type="checkbox"/>, 9 <input type="checkbox"/>, 11 <input type="checkbox"/>, 13 <input type="checkbox"/>, 15 <input type="checkbox"/>, 17 <input type="checkbox"/> in | MODE 16 |
| <input type="checkbox"/> | SWEEP | All RHIC Zones | |
| <input type="checkbox"/> | VERIFY | All RHIC Zones are | SWEEP OK |
| <input type="checkbox"/> | VERIFY | 24 ea #14 RHIC CA keys & 6 ea #15 RHIC Sweep keys are | CAPTURED |
| <input type="checkbox"/> | VERIFY | 3 ea #10 RF CA keys and 2 ea #15 RF Sweep keys are | CAPTURED |
| <input type="checkbox"/> | PLACE | Peer 7, 9, 11, 13, 15, 17 in No Access (Mode 24) | |
| <input type="checkbox"/> | VERIFY | MCR sees Peers 7 <input type="checkbox"/>, 9 <input type="checkbox"/>, 11 <input type="checkbox"/>, 13 <input type="checkbox"/>, 15 <input type="checkbox"/>, 17 <input type="checkbox"/> in | MODE 24 |
| <input type="checkbox"/> | VERIFY | MCR sees PSSwm is | ENABLED |
| <input type="checkbox"/> | VERIFY | MCR sees PSXarc90 is | ENABLED |
| <input type="checkbox"/> | VERIFY | MCR sees PSYarc90 is | ENABLED |
| <input type="checkbox"/> | REQUEST | MCR Operator Turn ON PSSwm and raise curr to 100 Amps | |
| <input type="checkbox"/> | VERIFY | MCR Operator sees on Pet page that PSSwm is | ON at 100Amps |
| <input type="checkbox"/> | VERIFY | On CD page MCR sees PSSwm is | ON |
| <input type="checkbox"/> | REQUEST | MCR Operator Turn ON PSXarc90 and raise curr to 100 Amps | |
| <input type="checkbox"/> | VERIFY | MCR Operator sees on Pet page that PSXarc90 is | ON at 100Amps |
| <input type="checkbox"/> | VERIFY | On CD page MCR sees PSXarc90 is | ON |
| <input type="checkbox"/> | REQUEST | MCR Operator Turn ON PSYarc90 and raise curr to 100 Amps | |
| <input type="checkbox"/> | VERIFY | MCR Operator sees on Pet page that PSYarc90 is | ON at 100Amps |
| <input type="checkbox"/> | VERIFY | On CD page MCR sees PSYarc90 is | ON |
| <input type="checkbox"/> | REQUEST | MCR Operator Turn ON PSUarc8 and raise curr to 100 Amps | |
| <input type="checkbox"/> | VERIFY | MCR Operator sees on Pet page that PSUarc8 is | ON at 100Amps |
| <input type="checkbox"/> | VERIFY | On CD page MCR sees PSUarc8 is | ON |
| <input type="checkbox"/> | REQUEST | MCR Operator Turn ON PSWarc20 and raise curr to 100 Amps | |
| <input type="checkbox"/> | VERIFY | MCR Operator sees on Pet page that PSWarc20 is | ON at 100Amps |
| <input type="checkbox"/> | VERIFY | On CD page MCR sees PSWarc20 is | ON |
| <input type="checkbox"/> | Check for acceptance of Confirm normal operation of Injection RchBack CDs: PSUarc8 & PS Warc20 and Injection Primary CDs: PSXarc90, PSYarc90 and PSSwm at 100Amps in Mode 24 | | |

1.39 Confirm, under power, removal of a key from the RHIC Key Tree disables only Injection Primary CDs: PSXarc90, PSYarc90 and PSSwm & RHIC CDs: G1BS and G2BS and does not affect Injection RchBack CDs: PSUarc8 & PSWarc20

- VERIFY** MCR sees Peers 5 , 7 , 9 , 11 , 13 , 15 , 17 is in **MODE 24**
- VERIFY** MCR sees Permit Link for Peers 7 , 9 , 11 , 13 , 15 , 17 **ENABLED**
- VERIFY** MCR Operator sees on Pet page that PSSwm is **ON at 100Amps**
- VERIFY** On CD page MCR sees PSSwm is **ON**
- VERIFY** MCR Operator sees on Pet page that PSXarc90 is **ON at 100Amps**
- VERIFY** On CD page MCR sees PSXarc90 is **ON**
- VERIFY** MCR Operator sees on Pet page that PSYarc90 is **ON at 100Amps**
- VERIFY** On CD page MCR sees PSYarc90 is **ON**
- VERIFY** MCR Operator sees on Pet page that PSUarc8 is **ON at 100Amps**
- VERIFY** On CD page MCR sees PSUarc8 is **ON**
- VERIFY** MCR Operator sees on Pet page that PSWarc20 is **ON at 100Amps**
- VERIFY** On CD page MCR sees PSWarc20 is **ON**

- PRESS** **RHIC Primary Beam Stop Withdraw** in MCR
- VERIFY** MCR sees Primary Beam Shutters: **G1BS, G2BS** **OUT**
- VERIFY** MCR sees RchBack Beam Shutter: **G3BS** **OUT**
- REMOVE** Any key from **RHIC Key Tree**

- VERIFY** **RHIC Key Tree Complete** is **OFF**
- VERIFY** MCR sees Peers 7 , 9 , 11 , 13 , 15 , 17 is in **MODE 2**
- VERIFY** MCR Operator sees on Pet page that PSSwm is **OFF**
- VERIFY** On CD page MCR sees PSSwm is **OFF**
- VERIFY** MCR Operator sees on Pet page that PSXarc90 is **OFF**
- VERIFY** On CD page MCR sees PSXarc90 is **OFF**
- VERIFY** MCR Operator sees on Pet page that PSYarc90 is **OFF**
- VERIFY** On CD page MCR sees PSYarc90 is **OFF**

- VERIFY** On CD page MCR sees Rhic Injn X/Y is **DISABLED**

- VERIFY** MCR sees Primary Beam Shutters: **G1BS, G2BS** **IN**
- VERIFY** MCR sees RchBack Beam Shutter: **G3BS** **OUT**

- VERIFY** MCR sees Permit Link for Peers 7 , 9 , 11 , 13 , 15 , 17 **DISABLED**

- VERIFY** On CD page MCR sees Rhic Injn U/W is **ENABLED**

- VERIFY** MCR Operator sees on Pet page that PSUarc8 is **ON at 100Amps**
- VERIFY** On CD page MCR sees PSUarc8 is **ON**
- VERIFY** MCR Operator sees on Pet page that PSWarc20 is **ON at 100Amps**
- VERIFY** On CD page MCR sees PSWarc20 is **ON**

- VERIFY** MCR Operator attempt to Turn ON PSSwm **FAIL**
- VERIFY** MCR Operator attempt to Turn ON PSXarc90 **FAIL**
- VERIFY** MCR Operator attempt to Turn ON PSYarc90 **FAIL**

- Check for confirmation of removal of a key from the RHIC Key Tree disables RHIC Injection Critical Devices & RHIC Critical Devices.**

END OF TEST PROCEDURE

TTL: Sign for completion of initial testing: _____

Date: ____/____/____

TTL: Sign for completion of final testing: _____

Date: ____/____/____