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 kept on file in the C-A ESHQ Training Office, Bldg. 911A

C-A OPERATIONS PROCEDURES MANUAL

ATTACHMENT

4.120.72.l. LINAC Relay Logic Tests

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

Hand Processed Changes

HPC No.	Date	Page Nos.	Initials
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

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

V. Castillo

4.120.72.l LINAC Relay Logic 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 Relay logic for Primary Crash on D40 – E013

SET **Logic states** of relays: **DK4, EK1, EK10, AK9, AK10, AK11, BK6 in Table 1 below**
VERIFY **State of BK1 in columns 8 and 9**

DK4 Tnk1 gate crash	EK1 Plug Door crash	EK10 AGS/HEBT gate crash	AK9 Tnk prim crash	AK10 BLIP prim crash	AK11 HEBT prim crash	BK6 Reset function	Prime Crash Verify BK1	
							ON	OFF
ON	ON	ON	ON	ON	ON	PULSE	□	xxxx
OFF	ON	ON	ON	ON	ON	PULSE	xxxx	□
ON	OFF	ON	ON	ON	ON	PULSE	xxxx	□
ON	ON	OFF	ON	ON	ON	PULSE	xxxx	□
ON	ON	ON	OFF	ON	ON	PULSE	xxxx	□
ON	ON	ON	ON	OFF	ON	PULSE	xxxx	□
ON	ON	ON	ON	ON	OFF	PULSE	xxxx	□
ON	ON	ON	ON	ON	ON	OFF	xxxx	□

Table 1 - Logic states of relays controlling Primary Crash

□ **Check for acceptance of Test of Relay logic for Primary Crash**

1.2 Test of Relay logic for Redundant Crash on D40 – E013

SET **Logic states** of relays: **DK4, EK1, EK10, BK2, BK3, BK4, BK6 in Table 2 below**
VERIFY **State of BK5 in columns 8 and 9**

DK4 Tnk1 gate crash	EK1 Plug Door crash	EK10 AGS/HEBT gate crash	BK2 Tnk rdnt crash	BK3 BLIP rdnt crash	BK4 HEBT rdnt crash	BK6 Reset function	Rdnt Crash Verify BK5	
							ON	OFF
ON	ON	ON	ON	ON	ON	PULSE	□	xxxx
OFF	ON	ON	ON	ON	ON	PULSE	xxxx	□
ON	OFF	ON	ON	ON	ON	PULSE	xxxx	□
ON	ON	OFF	ON	ON	ON	PULSE	xxxx	□
ON	ON	ON	OFF	ON	ON	PULSE	xxxx	□
ON	ON	ON	ON	OFF	ON	PULSE	xxxx	□
ON	ON	ON	ON	ON	OFF	PULSE	xxxx	□
ON	ON	ON	ON	ON	ON	OFF	xxxx	□

Table 2 - Logic states of relays controlling Redundant Crash

□ **Check for acceptance of Test of Relay logic for Redundant Crash**

1.3 Test of Relay logic for Controlled Access (CA) on D40 – E014

Put the Linac into RA with **BNL-3** key and the **Black P/B**

□	**VERIFY**	At encl 4880 relay **EK5** is	**OFF**
□	**VERIFY**	Attempt to put the Linac into CA with the **BNL-3** key only	**FAIL**
□	**VERIFY**	At encl 4880 relay **EK5** is	**OFF**
□	**VERIFY**	Attempt to put the Linac into CA with the **BNL-3** key and the **Red P/B**	**SUCCESFUL**
□	**VERIFY**	At encl 4880 relay **EK5** is	**ON**

SET **Logic state** of relay **FK5, in Table 3 below**
VERIFY **State of DK1, DK10, EK7, IK6** and **IK14 in major columns 2 thru 6**

FK5 Controlled Access	**DK1** Tnk1 CA		**DK10** Plug Door CA		**EK7** AGS/HEBT CA		**IK6** Cont. Access		**IK14** Cont. Access	
	ON	**OFF**	**ON**	**OFF**	**ON**	**OFF**	**ON**	**OFF**	**ON**	**OFF**
ON	□	**xxxx**	□	**xxxx**	□	**xxxx**	□	**xxxx**	□	**xxxx**
OFF	**xxxx**	□	**xxxx**	□	**xxxx**	□	**xxxx**	□	**xxxx**	□

Table 3 - Logic states of relays controlling Controlled Access

□ **Check for acceptance of Test of Relay logic for Controlled Access**

1.4 Test of Relay logic for Sequential Sweep Complete on D40 – E014

SET **Logic state** of relays **FK5** and **FK9, in Table 4 below in sequence listed**
VERIFY **State of HK8 in major column 3**

FK5 Controlled Access	**FK9** BS2 Intlks	**Seq. Sweep complete** Verify HK8	
		ON	**OFF**
ON	**OFF**	**xxxx**	□
OFF	**ON**	**xxxx**	□
ON	**ON**	□	**xxxx**
ON	**OFF**	□	**xxxx**
OFF	**xxxxx**	**xxxx**	□

Table 4 - Logic states of relays controlling Sequential Sweep Complete

□ **Check for acceptance of Test of Relay logic for Sequential Sweep Complete**

1.5 Test of Relay logic for Linac Tunnel Area Cleared on D40 – E014

SET **Logic states** of relays: **DK3, DK12, EK9, DK7, EK3, EK4, FK1, BK9 in Table 5 below in sequence listed**
VERIFY **State of FK4 and AK3 in columns 9 and 10**

DK3 Tnk1 gate closed	**DK12** Plug door reset	**EK9** Ags/Hebt gate reset	**DK7** Tnk9 gate locked	**EK3** Swing gate locked	**EK4** BLIP gate closed	**FK1** HEBT gate locked	**BK9** Reset function	**FK4 Linac area cleared &AK3 Linac area reset Verify FK4 and AK3**	
								ON + Bzr for 15 sec	**OFF**
ON	**ON**	**ON**	**ON**	**ON**	**ON**	**ON**	**OFF**	**xxxx**	□
ON	**ON**	**ON**	**ON**	**ON**	**ON**	**ON**	**ON**	□	**xxxx**
ON	**ON**	**ON**	**ON**	**ON**	**ON**	**ON**	**OFF**	□	**xxxx**
OFF	**ON**	**ON**	**ON**	**ON**	**ON**	**ON**	**ON**	**xxxx**	□
ON	**OFF**	**ON**	**ON**	**ON**	**ON**	**ON**	**ON**	**xxxx**	□
ON	**ON**	**OFF**	**ON**	**ON**	**ON**	**ON**	**ON**	**xxxx**	□
ON	**ON**	**ON**	**OFF**	**ON**	**ON**	**ON**	**ON**	**xxxx**	□
ON	**ON**	**ON**	**ON**	**OFF**	**ON**	**ON**	**ON**	**xxxx**	□
ON	**ON**	**ON**	**ON**	**ON**	**OFF**	**ON**	**ON**	**xxxx**	□
ON	**ON**	**ON**	**ON**	**ON**	**ON**	**OFF**	**ON**	**xxxx**	□

Table 5 - Logic states of relays controlling Linac Tunnel Area Cleared

□ **Check for acceptance of Test of Relay logic for Linac Tunnel Area Cleared**

1.6 Test of Relay logic for Linac area Reset Primary on D40 – E014

SET **Logic state** of relay **FK4, in Table 6 below**
VERIFY **State of AK3 in columns 2 and 3**

FK4 Linac area secured	**Linac area Reset Verify AK3**	
	ON after 15 sec Time delay	**OFF**
ON	□	**xxxx**
OFF	**xxxx**	□

Table 6 - Logic states of relays controlling Linac area Reset Primary

□ **Check for acceptance of Test of Relay logic for Linac area Reset Primary**

1.7 Test of Relay logic for Linac Ready for Beam Primary on D40 – E014

SET **Logic states** of relays: **AK3, AK4, BK1** and **BK5 in Table 7 below**
VERIFY **State of** relay **GK12 in columns 5 and 6**

AK3 Prim Intlk	AK4 Rdnt Intlk	BK1 Crash Prim	BK5 Crash Rdnt	Linac Ready for Beam Prim Verify GK12	
				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	□

Table 7 - Logic states of relays controlling Linac Ready for Beam Primary

□ **Check for acceptance of Test of Relay logic for Linac Ready for Beam Primary**

1.8 Test of Relay logic for Linac Ready for Beam Redundant on D40 – E014

SET **Logic states** of relays: **AK3, AK4, BK1** and **BK5 in Table 8 below**
VERIFY **State of** relay **HK1 in columns 5 and 6**

AK3 Prim Intlk	AK4 Rdnt Intlk	BK1 Crash Prim	BK5 Crash Rdnt	Linac Ready for Beam Rdnt Verify HK1	
				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	□

Table 8 - Logic states of relays controlling Linac Ready for Beam Redundant

□ **Check for acceptance of Test of Relay logic for Linac Ready for Beam Redundant**

1.9 Test of Relay logic for LEBT BS2 Intlk Primary on D40 – E014

SET **Logic states** of relays: **GK12, HK3, FK7, LK1, CK7, BK14, AK13, BK15, CK8 in Table 9 below**
VERIFY **State of FK8 in columns 10 and 11**

GK12 Linac ready for beam	HK3 Nz304 /307 BS failure	FK7 (NC) Tnk1 RFN/Intlk	LK1 Bstr Failure Rhbk	CK7 Hebt BM 1/2 Intlk clear	BK14 Tnk4/5 Cmk OK	AK13 BLIP cmk 1 OK	BK15 BLIP cmk 2 OK	CK8 Tnk1 cmk OK	BS2 Intlk Prim Verify FK8	
									ON	OFF
ON	ON	OFF	ON	ON	ON	ON	ON	ON	□	xxxx
OFF	ON	OFF	ON	ON	ON	ON	ON	ON	xxxx	□
ON	OFF	OFF	ON	ON	ON	ON	ON	ON	xxxx	□
ON	ON	ON	ON	ON	ON	ON	ON	ON	xxxx	□
ON	ON	OFF	OFF	ON	ON	ON	ON	ON	xxxx	□
ON	ON	OFF	ON	OFF	ON	ON	ON	ON	xxxx	□
ON	ON	OFF	ON	ON	OFF	ON	ON	ON	xxxx	□
ON	ON	OFF	ON	ON	ON	OFF	ON	ON	xxxx	□
ON	ON	OFF	ON	ON	ON	ON	OFF	ON	xxxx	□
ON	ON	OFF	ON	ON	ON	ON	ON	OFF	xxxx	□

Table 9 - Logic states of relays controlling LEBT BS2 Intlk Primary

□ **Check for acceptance of Test of Relay logic for LEBT BS2 Intlk Primary**

1.10 Test of Relay logic for LEBT BS2 Intlk Redundant on D40 – E014

SET **Logic states** of relays: **HK1, EK5, FK7, LK1, CK7, BK14, AK13, BK15, CK8 in Table 140below**
VERIFY **State of FK9 in columns 10 and 11**

HK1 Linac ready for beam	EK5 Nz304 /307 BS failure	FK7 (NC) Tnk1 RFN/Intlk	LK1 Bstr Failure Rhbk	CK7 Hebt BM 1/2 Intlk clear	BK14 Tnk4/5 Cmk OK	AK13 BLIP cmk 1 OK	BK15 BLIP cmk 2 OK	CK8 Tnk1 cmk OK	BS2 Intlk Rdnt Verify FK9	
									ON	OFF
ON	ON	OFF	ON	ON	ON	ON	ON	ON	□	xxxx
OFF	ON	OFF	ON	ON	ON	ON	ON	ON	xxxx	□
ON	OFF	OFF	ON	ON	ON	ON	ON	ON	xxxx	□
ON	ON	ON	ON	ON	ON	ON	ON	ON	xxxx	□
ON	ON	OFF	OFF	ON	ON	ON	ON	ON	xxxx	□
ON	ON	OFF	ON	OFF	ON	ON	ON	ON	xxxx	□
ON	ON	OFF	ON	ON	OFF	ON	ON	ON	xxxx	□
ON	ON	OFF	ON	ON	ON	OFF	ON	ON	xxxx	□
ON	ON	OFF	ON	ON	ON	ON	OFF	ON	xxxx	□
ON	ON	OFF	ON	ON	ON	ON	ON	OFF	xxxx	□

Table 10 - Logic states of relays controlling LEBT BS2 Intlk Redundant

□ **Check for acceptance of Test of Relay logic for LEBT BS2 Intlk Redundant**

1.11 Test of Relay logic for LEBT BS1 Interlock on D40 – E014

SET **Logic states** of relays: **FK8, FK9, GK2** and **FK7 in Table 11 below**
VERIFY **State of** relays **GK6** and **GK7 in columns 5 and 6**

FK8 LEBT BS2 Intlk OK prim	FK9 LEBT BS2 Intlk OK Rdnt	GK2 LEBT BS2 Closed	FK7 Tnk RF Intlk	LEBT BS1 Interlock Verify GK6 and GK7	
				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	□
OFF	ON	ON	OFF	xxxxxxx	□
ON	OFF	OFF	ON	xxxxxxx	□
ON	OFF	ON	OFF	xxxxxxx	□
OFF	OFF	OFF	OFF	xxxxxxx	□

Table 11 - Logic states of relays controlling LEBT BS1 Interlock

□ **Check for acceptance of Test of Relay logic for LEBT BS1 Interlock**

1.12 Test of Relay logic for LEBT BS1 Failure on D40 – E014

SET **Logic states** of relays: **GK4, GK6, GK7, GK10** and **GK3 in Table 12 below**
VERIFY **State of** relays **FK10 in columns 6 and 7**

GK4 LEBT BS1 water OK	**GK6** LEBT BS1 Intlk OK Prim	**GK7** LEBT BS1 Intlk OK Rdnt	**GK10** BS1 Open Com	**GK3** Bypass for GK6, GK7 and GK10 Insulate GK3 contacts for OFF	LEBT BS1 Failure Verify FK10	
					ON	OFF with TDOD of 3 sec
ON	ON	ON	ON	OFF	□	xxxxxxx
OFF	ON	ON	ON	OFF	xxxxxxx	□
ON	OFF	ON	ON	OFF	xxxxxxx	□
ON	ON	OFF	ON	OFF	xxxxxxx	□
ON	ON	ON	OFF	OFF	xxxxxxx	□
ON	OFF	OFF	OFF	ON	□	xxxxxxx
ON	ON	OFF	OFF	ON	□	xxxxxxx
ON	ON	ON	OFF	ON	□	xxxxxxx
ON	ON	ON	ON	ON	□	xxxxxxx

Table 12 - Logic states of relays controlling LEBT BS1 Failure

□ **Check for acceptance of Test of Relay logic for LEBT BS1 Failure**

1.13 Test of Relay logic for LEBT BS2 Failure on D40 – E014

SET **Logic states** of relays: **GK5, FK8, FK9, GK11** and **GK2 in Table 13 below**
VERIFY **State of** relays **GK1 and CK1 in columns 6, 7 and 8**

GK5 LEBT BS2 water OK	**FK8** LEBT BS2 Intlk OK Prim	**FK9** LEBT BS2 Intlk OK Rdnt	**GK11** BS2 Open Com	**GK2** Bypass for FK8, FK9 and GK11. Insulate GK2 contacts for OFF	LEBT BS2 Failure Verify GK1 and CK1		
					ON	GK1 OFF with TOD 3 secs	CK1 OFF with TDOD of 5 secs
ON	ON	ON	ON	OFF	□	xxxxxxx	xxxxxxx
OFF	ON	ON	ON	OFF	xxxxxxx	□	□
ON	OFF	ON	ON	OFF	xxxxxxx	□	□
ON	ON	OFF	ON	OFF	xxxxxxx	□	□
ON	ON	ON	OFF	OFF	xxxxxxx	□	□
ON	OFF	OFF	OFF	ON	□	xxxxxxx	xxxxxxx
ON	ON	OFF	OFF	ON	□	xxxxxxx	xxxxxxx
ON	ON	ON	OFF	ON	□	xxxxxxx	xxxxxxx
ON	ON	ON	ON	ON	□	xxxxxxx	xxxxxxx

Table 13 - Logic states of relays controlling LEBT BS2 Failure

□ **Check for acceptance of Test of Relay logic for LEBT BS2 Failure**

1.14 Test of Relay logic for LEBT BS1 on D40 – E015

SET **Logic states** of relays: **GK6, GK7, GK10,CK3** and **GK13 in Table 14 below**

VERIFY **State of BS1 in columns 6 and 7**

GK6 BS1 Interlock Pr	**GK7** BS1 Interlock Rd	**GK10** BS1 open command	**CK3** BNL3 captive	**GK13** LEBT BS lockout	**Verify BS1** (GK8 and GK3) (use light indicator if necessary)	
					CLOSED (GK3 on &GK8 off)	**OPEN** (GK8 on &GK3 off)
ON	**ON**	**ON**	**ON**	**ON**	**xxxxxxx**	□
OFF	**ON**	**ON**	**ON**	**ON**	□	**xxxxxxx**
ON	**OFF**	**ON**	**ON**	**ON**	□	**xxxxxxx**
ON	**ON**	**OFF**	**ON**	**ON**	□	**xxxxxxx**
ON	**ON**	**ON**	**OFF**	**ON**	□	**xxxxxxx**
ON	**ON**	**ON**	**ON**	**OFF**	□	**xxxxxxx**

Table 14 - Logic states of relays controlling BS1

□ **Check for acceptance of Test of Relay logic for LEBT BS1**

1.15 Test of Relay logic for LEBT BS2 on D40 – E015

SET **Logic states** of relays: **FK8, FK9, GK11, CK3** and **GK13 in Table 15 below**

VERIFY **State of BS2 in columns 6 and 7**

FK8 BS2 Interlock Pr	**FK9** BS2 Interlock Rd	**GK11** BS2 open command	**CK3** BNL3 captive	**GK13** LEBT BS lockout	**Verify BS2** (GK9 and GK2) (use light indicator if necessary)	
					CLOSED (GK2 on &GK9 off)	**OPEN** (GK9 on &GK2 off)
ON	**ON**	**ON**	**ON**	**ON**	**xxxxxxx**	□
OFF	**ON**	**ON**	**ON**	**ON**	□	**xxxxxxx**
ON	**OFF**	**ON**	**ON**	**ON**	□	**xxxxxxx**
ON	**ON**	**OFF**	**ON**	**ON**	□	**xxxxxxx**
ON	**ON**	**ON**	**OFF**	**ON**	□	**xxxxxxx**
ON	**ON**	**ON**	**ON**	**OFF**	□	**xxxxxxx**

Table 15– Logic states of relays controlling BS2

□ **Check for acceptance of Test of Relay logic for LEBT BS2**

1.16 Test of Relay logic for Linac Safely OFF on D40 – E015

SET **Logic states** of relays: **GK5, CK4, GK2,HK6** and **FK7 in Table 16 below**
VERIFY **State of** relays: **HK4 and HK5 in columns 6 and 7**

GK5 BS2 water OK	**CK4** RFQ HV OFF	**GK2** BS2 closed	**HK6** BS1 closed & BS1 water OK or RFQ HV OFF	**FK7** Tnk1 RF disab	**Linac Safely OFF Verify HK4 and HK5**	
					ON	**OFF**
ON	**ON**	**ON**	**ON**	**ON**	□	**xxxxxxx**
OFF	**ON**	**ON**	**ON**	**ON**	□	**xxxxxxx**
ON	**OFF**	**ON**	**ON**	**ON**	□	**xxxxxxx**
ON	**ON**	**OFF**	**ON**	**ON**	**xxxxxxx**	□
ON	**ON**	**ON**	**OFF**	**ON**	□	**xxxxxxx**
ON	**ON**	**ON**	**ON**	**OFF**	□	**xxxxxxx**

Table 16 - Logic states of relays controlling Linac Safely OFF

□ **Check for acceptance of Test of Relay logic for Linac Safely OFF**

1.17 Test of Relay logic for Gate-Redundant Interlock OK on D40 – E016

SET **Logic states** of relays: **DK5, EK2, EK11, IK12, IK13** and **BK7 in Table 17 below**
VERIFY **State of AK4 in columns 7 and 8**

DK5 Tnk1 gate closed	**EK2** Plug door closed	**EK11** Ags/Hebt gate closed	**IK12** HEBT gate closed	**IK13** BLIP gate closed	**BK7** Redun reset	**Redun Intlk OK Verify AK4**	
						ON	**OFF**
ON	**ON**	**ON**	**ON**	**ON**	**OFF**	**xxxxxxx**	□
ON	**ON**	**ON**	**ON**	**ON**	**ON**	□	**xxxxxxx**
ON	**ON**	**ON**	**ON**	**ON**	**OFF**	□	**xxxxxxx**
OFF	**ON**	**ON**	**ON**	**ON**	**ON**	**xxxxxxx**	□
ON	**OFF**	**ON**	**ON**	**ON**	**ON**	**xxxxxxx**	□
ON	**ON**	**OFF**	**ON**	**ON**	**ON**	**xxxxxxx**	□
ON	**ON**	**ON**	**OFF**	**ON**	**ON**	**xxxxxxx**	□
ON	**ON**	**ON**	**ON**	**OFF**	**ON**	**xxxxxxx**	□

Table 17 - Logic states of relays controlling Redundant Interlock OK

□ **Check for acceptance of Test of Relay logic for Redundant Interlock OK**

1.18 Test of Relay logic for Tank RF Pulsing cleared on D40 – E023

SET **Logic states** of relays: **IK7, 1K10, IK3, DK6, FK2** and **IK11 in Table 18 below**
VERIFY **State of IK11 and FK2 in columns 5 and 6**

IK7 Tnk 9 reset for beam	**IK10** Tnk 1 reset for beam	**IK3** Tnk 9 reset for RF	**DK6** Tnk 1 reset for RF	**Tnk RF pulsing cleared Verify IK11 & FK2**	
				ON	**OFF**
ON	**ON**	**OFF**	**OFF**	□	**xxxxxxxx**
OFF	**ON**	**OFF**	**OFF**	**xxxxxxxx**	□
ON	**OFF**	**OFF**	**OFF**	**xxxxxxxx**	□
OFF	**OFF**	**ON**	**ON**	□	**xxxxxxxx**
OFF	**OFF**	**OFF**	**ON**	**xxxxxxxx**	□
OFF	**OFF**	**ON**	**OFF**	**xxxxxxxx**	□

Table 18 – Logic states of relays controlling Tank RF Pulsing cleared

□ **Check for acceptance of Test of Relay logic for Tank RF Pulsing cleared**

1.19 Test of Relay logic for RF 50 KV PSs Interlock OK on D40 – E023

SET **Logic states** of relays: **CK2, AK9, BK2, DK4, IK2**, **IK11**and **IK5 in Table 19 below**
VERIFY **State of IK5 in columns 7 and 8**

CK2 Tnk area on RF CA	**AK9** Tnk Crash OK	**BK2** Tnk crash OK	**DK4** Tnk 1 gate crash OK	**IK2** Tnk 9 gate crash OK	**IK11** RF pulsing Intlk OK	**RF 50 KV PSs Intlk OK Verify IK5**	
						ON	**OFF**
ON	**ON**	**ON**	**ON**	**ON**	**OFF**	**xxxx**	□
ON	**ON**	**ON**	**ON**	**ON**	**ON**	□	**xxxx**
ON	**ON**	**ON**	**ON**	**ON**	**OFF**	□	**xxxx**
OFF	**ON**	**ON**	**ON**	**ON**	**ON**	**xxxx**	□
ON	**OFF**	**ON**	**ON**	**ON**	**ON**	**xxxx**	□
ON	**ON**	**OFF**	**ON**	**ON**	**ON**	**xxxx**	□
ON	**ON**	**ON**	**OFF**	**ON**	**ON**	**xxxx**	□
ON	**ON**	**ON**	**ON**	**OFF**	**ON**	**xxxx**	□

Table 19 – Logic states of relays controlling RF 50 KV PSs Interlock OK

□ **Check for acceptance of Test of Relay logic for RF 50 KV PSs Interlock OK**

1.20 Test of Relay logic for Tank RF Controlled Access on D40 – E023

SET **Logic states** of relays: **1K4 and DK5 in Table 20 below**
VERIFY **State of CK2 and FK3 in columns 5 and 6**

IK4 Tnk 1 Closed	DK5 Tnk 9 Closed	ME-16 RF in Sec Panel	Tnk RF Controlled Access Verify CK2 & FK3	
			ON	OFF
ON	ON	CW	□	xxxxxxxx
ON	ON	CCW	xxxxxxxx	□
ON	ON	CW	□	xxxxxxxx
OFF > 2 Min	ON	xxxxxxxx	xxxxxxxx	□
ON	ON	CW	□	xxxxxxxx
ON	OFF > 2 Min	xxxxxxxx	xxxxxxxx	□

Table 20 – Logic states of relays controlling Tank RF Controlled Access

□ **Check for acceptance of Test of Relay logic for Tank RF Controlled Access**

END OF TEST PROCEDURE

TTL: Sign for completion of initial testing: _____

Date: _____/____/_____

TTL: Sign for completion of final testing: _____

Date: _____/____/_____