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APPROVED FOR PUBLIC RELEASE

WHC Information Release Administration Specialist:


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January 25, 1995

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7. Abstract

This test procedure provides the steps necessary to verify correct functional operation of controls, annunciators, alarms, protective relays and related systems impacted by CENRTC #2F3E0A, Microwave Transfer Trip Project, modification work performed under work package 6B-93-00041/M (CENRTC 2F3E0A MWTT OCB A-376 PACKAGE).

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**WHC-SD-LL-ATP-022
Revision 0**

**CENRTC PROJECT #2F3E0A
OCB A-376
ACCEPTANCE TEST PROCEDURE**

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1.0 PURPOSE

This test procedure provides the steps necessary to verify correct functional operation of controls, annunciators, alarms, protective relays and related systems impacted by CENRTC #2F3E0A, Microwave Transfer Trip Project, modification work performed under work package 6B-93-00041/M (CENRTC 2F3E0A MWTT OCB A-376 PACKAGE).

2.0 SCOPE

This acceptance test procedure shall only be used in conjunction with work package 6B-93-00041/M.

3.0 REFERENCES

- 3.1 Marked-up blue lines from work package 6B-93-00041/M.
- 3.2 Copy of ECN 604869 and the latest revision of the substation A7 one-line, three-lines, control and interconnection drawings.
- 3.3 RFL Dowtey Model 6750 ITTS Instruction Manual.

4.0 ACCEPTANCE TEST PROCEDURE

- 4.1 A Lead Protective Relay Technician shall be appointed by the Substation/Relay Manager prior to this work commencing. **The Lead Technician shall be responsible for initialing each step of Sections 5 through 9 as it is successfully completed, regardless of additional signature or initialing requirements indicated in a particular step.**
- 4.2 It is the responsibility of the **Lead Relay Technician** to report any discrepancies or problems associated with the following steps to the EUE System Protection Engineer and record same in Section 10.0.
- 4.3 The EUE System Protection Engineer shall be present for all testing.
- 4.4 This procedure separates three tests into separate sections.
 - Section 5.0 - Energization of A-376 Duplex Panel and Circuits.
 - Section 7.0 - SCADA tests.
 - Section 8.0 - A-376 local trip tests.

NOTE: Local RFL 6750 function tests and start-up and A-376/Ashe/Å-382 μ Wave trip tests will be performed under WHC-SD-LL-ATP-023 (A-382 ATP).

5.0 ENERGIZATION OF A-376 DUPLEX PANEL AND CIRCUITS

5.1 Equipment Configuration

5.1.1 Verify the following test switches are in the open position.

Panel 3F	
Device Number	Description
3G	SEL SET #1 TRIP AND MONITOR CONTACTS
4G	SEL SET #1 AC VOLTAGE INPUT
5G	SEL SET #1 CURRENT AND POLARIZATION INPUT
6G	SEL SET #2 TRIP AND MONITOR CONTACTS
7G	SEL SET #2 AC VOLTAGE INPUT
8G	SEL SET #2 CURRENT AND POLARIZATION INPUT

Panel 3R		
Device	Test Switch	Description
4M	POLE 1-2	OCB A-376 TRIP VIA 86-TB2
4M	POLE 3-4-5-6	OCB A-376 CLOSE BLOCK VIA 86-TB2
6M	POLE 7-8	OCB A-376 TRIP VIA 86-T2
6M	POLE 9-10-11-12	OCB A-376 CLOSE BLOCK VIA 86-T2

5.1.2 Verify the following SCADA switches are in the open position.

Panel 2F, Mini-Control Panel	
Device Number	Description
A-376 SCS	A-376 SCADA CUT-OFF SWITCH
A-376 RCS	A-376 RECLOSING CUT-OFF SWITCH
A-376 HOTLINE	A-376 HOT LINE BYPASS SWITCH

5.1.3 Verify the following 125 Vdc breakers are in the open position.

Panel or Rack	Device Number	Description
Panel 3R	2G	A-376 TRIP BUS BFR
	3G	A-376 TRIP BUS RELAY SET #1
	4G	A-376 TRIP BUS RELAY SET #2
	5G	A-376 CLOSE BUS
	6G	A-376 TRIP BUS
	7G	TRIP BUS 86-TB2
	8G	TRIP BUS 86-T2
Rack C1	2E	A-376 RFL
Panel 2F	3F	ANNUNCIATOR BUS
	9F	A-376 LOCAL CONTROL

5.1.4 Verify the following 115 Vac breakers are in the open position.

Panel or Rack	Device Number	Description
Panel 2R	8H	A-376 RECLOSER MOTOR
Panel 3F	LA1	A-376 RELAY POT #2A RELAY SET #1
	LA2	A-376 RELAY POT #2 RELAY SET #2
Bus #2 PT Cabinet	RLY POT #2	RELAY POTENTIAL #2 BREAKER
	RLY POT #2A	RELAY POTENTIAL #2A BREAKER

5.1.5 Verify the devices are switched to the OFF position.

Panel or Rack	Device Number	Description
Rack C1	D	A-376 RFL 6750
Panel 3F	3C	A-376 SEL 121-G-5 SET #1 RELAY
	4C	A-376 SEL 121-G-5 SET #2 RELAY

5.1.6 Verify the manual test switch on the RFL 6750 relay for A-376, Device C located on Rack C1 is switched to the OFF position.

5.2 Energize A376 Control Circuits

5.2.1 Energize the A7 annunciator bus by closing device 3F, located on Panel 2F. Acknowledge and reset alarms. Verify the following annunciators remain illuminated and that the Dispatcher indicates the following SCADA Indication Points.

Annunciator Window	SCADA Points
W26 - 230 KV TRIP BUS FAILURE	51 - 230 KV TRIP BUS FAILURE
W27 - OCB A-376 ITTS EQPT FAILURE	22 - A-376 ITTS EQPT FAILURE
W28 - 230KV CLOSE BUS FAILURE	N/A
W29 - ITTS LOW TRANSMIT LEVEL	49 - ITTS LOW TRANSMIT LEVEL
W6 - OCB A376 SEL RELAY FAILURE	13 - SEL RELAY TROUBLE
W30 - 230KV RELAY POT FAILURE	18 - A-376 PCB RELAY TROUBLE
W34 - BUS 2 PT ACB TRIP ALARM	

5.2.2 Close the following 125 Vdc breakers and verify, where noted, that the associated annunciator clears after the alarm has been acknowledged and reset and that the Dispatcher indicates the same for the respective SCADA Indication Points.

Panel 3R			
Device Number	Description	Annunciator Window	SCADA Alarm
2G	A-376 TRIP BUS BFR	N/A	N/A
3G	A-376 TRIP BUS RELAY SET #1	N/A	N/A
4G	A-376 TRIP BUS RELAY SET #2	N/A	N/A
5G	A-376 CLOSE BUS	W28 - 230 KV CLOSE FAILURE	N/A
6G	A-376 TRIP BUS	W26 - 230KV TRIP BUS FAILURE	N/A
7G	TRIP BUS 86-TB2	N/A	N/A
8G	TRIP BUS 86-T2	N/A	N/A

Panel 2F			
Device Number	Description	Annunciator Window	SCADA Alarm
9F	OCB A376 LOCAL CONT. BUS	N/A	14 - A-376 PCB STATUS 15 - A-376 SCS STATUS 16 - A-376 RECLOSING STATUS

5.2.3 Close the following 115 Vac breakers and verify, where noted, that the associated annunciator clears after the alarm has been acknowledged and reset and that the Dispatcher indicates the same for the respective SCADA Indication Points.

Panel or Rack	Device Number	Description	Annunciator Window	SCADA Point
2R	8H	A-376 RECLOSER MOTOR	N/A	N/A
3F	LA1	A-376 RELAY POT #2A RELAY SET #1		
	LA2	A-376 RELAY POT #2 RELAY SET #2	W30 - 230KV RELAY POT FAILURE	
BUS #2 PT CABINET	RLY POT #2	RELAY POTENTIAL #2 BREAKER		
	RLY POT #2A	RELAY POTENTIAL #2A BREAKER	W34 - BUS 2 PT ACB TRIP ALARM	18 - A-376 PCB RELAY TROUBLE

_____ 5.2.4 Switch the following devices to the **ON** position and verify, where noted, that the associated annunciator clears after the alarm has been acknowledged and reset and that the Dispatcher indicates the same for the respective SCADA Indication Points.

Panel or Rack	Device Number	Description	Annunciator Window	SCADA Point
3F	3C	A-376 SEL 121-G-5 SET #1 RELAY		
	4C	A-376 SEL 121-G-5 SET #2 RELAY	W6 - A376 SEL RELAY FAILURE	13 - SEL RELAY TROUBLE

5.3 Local OCB A-376 Operation and Alarm Verification

_____ 5.3.1 Place a temporary jumper between terminal **3** and **10** of Device **5D** (A-376 Sync Check Relay) on Panel **3R**.

_____ 5.3.2 Close the **SCADA cut-off switch (SCS)** for **OCB A376** (in the **ON** position).

_____ 5.3.3 Verify with the Dispatcher that SCADA has indicated that the **A-376 SCS** switch is **CLOSED** (verifies SCADA Indication Point 15 - A-376 SCS Status).

_____ 5.3.4 From the mini-control panel (Panel **2F**) **CLOSE**, then **OPEN OCB A-376**.

_____ 5.3.5 Verify the breaker closes and opens on command.

_____ 5.3.6 Verify with the Dispatcher that SCADA has indicated the close and open operations (verifies SCADA Indication Point 14 - A-376 PCB Status).

_____ 5.3.7 Verify the A-376 indication lamps (green and red) have indicated the proper status during the open and closing cycles.

5.4 Return Test Switch Configuration to Normal

5.4.1 Place the following test switches in the closed position.

Panel 3F	
Device Number	Description
3G	SEL SET #1 TRIP AND MONITOR CONTACTS
4G	SEL SET #1 AC VOLTAGE INPUT
5G	SEL SET #1 CURRENT AND POLARIZATION INPUT
6G	SEL SET #2 TRIP AND MONITOR CONTACTS
7G	SEL SET #2 AC VOLTAGE INPUT
8G	SEL SET #2 CURRENT AND POLARIZATION INPUT

Panel 3R		
Device	Test Switch	Description
4M	POLE 1-2	OCB A-376 TRIP VIA 86-TB2
4M	POLE 3-4-5-6	OCB A-376 CLOSE BLOCK VIA 86-TB2
6M	POLE 7-8	OCB A-376 TRIP VIA 86-T2
6M	POLE 9-10-11-12	OCB A-376 CLOSE BLOCK VIA 86-T2

5.5 Energization of A-376 Duplex Panels and Circuits Tests Acceptance

5.5.1 The Lead Relay Technician and EUE System Protection Engineer shall sign below indicating tests have been completed successfully.

Lead Relay Technician

Date

EUE System Protection Engineer

Date

6.0 LOCAL RFL 6750 FUNCTION TESTS AND START-UP

NOTE: LOCAL RFL 6750 FUNCTIONAL TEST AND START-UP WAS PERFORMED ON WHC-SD-LL-ATP-021 (A-372 ATP).

7.0 SCADA TESTS

7.1 Status of Previously Verified SCADA Indication Points Tests

7.1.1 The following SCADA indication points were alarmed in step 5.2.1 and cleared in Step 5.2.3 and therefore have been verified.

SCADA Point	Clear Step
18 - A-376 PCB RELAY POTENTIAL	5.2.3
13 - SEL RELAY TROUBLE	

7.1.2 The following SCADA indication points were alarmed in step 5.2.1 and cleared in Step 5.2.2 and therefore have been verified.

SCADA Point	Clear Step
14 - A-376 PCB STATUS	5.3.6
15 - A-376 SCS STATUS	5.3.3
16 - A-376 RECLOSING STATUS	TO BE PERFORMED LATER

7.2 Remaining SCADA Indication Points Tests

7.2.1 RFL 6750 SCADA Indication Points.

NOTE: LOCAL RFL 6750 FUNCTIONAL SCADA INDICATION POINTS WERE PERFORMED ON WHC-SD-LL-ATP-021 (A-372 ATP).

7.2.2 Line A2-7 Hot Line/Dead Line SCADA Indication Point

7.2.2.1 Simulate contact closure by placing a shorting strip between the following contacts of the NGV (Hot Line) Relay (Device 3D), located on Panel 3R, to activate the associated SCADA indication point. Verify alarm with the Dispatcher, remove shorting strip, then verify with the Dispatcher that the alarm has cleared.

Panel 3R		
NGV Relay	Terminals to Short (located on NGV Relay)	SCADA Point
3D	7 and 8	20 - A7-9 LINE HOTLINE INDICATOR

7.2.3 A-376 Reclosing SCS Switch

7.2.3.1 Place the Reclosing cut-off switch (RCS) for OCB A-376 in the **CLOSED** (in the **ON** position).

7.2.3.2 Verify with the Dispatcher that SCADA has indicated that the A-376 Reclosing SCS switch is closed.

7.3 SCADA Control Verification

7.3.1 A-376 Open and Close Controls

7.3.1.1 Request the Dispatcher to **CLOSE**, then **OPEN** OCB A-376 from the Dispatchers Terminal.

7.3.1.2 Verify the breaker closes and opens on command (verifies SCADA Control Point 03).

7.3.1.3 Acknowledge and Reset annunciators.

7.3.2 A-376 Reclosing Controls

- _____ 7.3.2.1 Request the Dispatcher to place then remove the reclosing relay system for **A-376** into and out-of service from the Dispatchers Terminal.
- _____ 7.3.2.2 Verify with the Dispatcher that SCADA has indicated that the reclosing system was placed into and out-of service (verifies SCADA Control Point 05).
- _____ 7.3.2.3 Have the Dispatcher acknowledge and reset the SCADA alarm.

7.4 SCADA Indication and Control Points Tests Acceptance

7.4.1 The **Lead Relay Technician** and **EUE System Protection Engineer** shall sign below indicating tests have been completed successfully.

Lead Relay Technician

Date

EUE System Protection Engineer

Date

8.0 A-376 LOCAL TRIP TESTS

8.1 Circuit Breaker Open/Close Operations

- _____ 8.1.1 **CLOSE and OPEN OCB A-376** twice from the mini-control panel to verify it is operating correctly.
- _____ 8.1.2 Request that the dispatcher **CLOSE and OPEN OCB A-376** twice via SCADA to verify correct operations occur.
- _____ 8.1.3 **CLOSE and OPEN OCB A-374** twice from the mini-control panel to verify it is operating correctly.
- _____ 8.1.4 Request the dispatcher **CLOSE and OPEN OCB A-374** twice via SCADA, then verify correct operations occur.
- _____ 8.1.5 Verify ACB **C7X200** is racked out and in the test position.
- _____ 8.1.6 **CLOSE and OPEN ACB C7X200** from the front of the cubical.

8.2 Transformer #1 Trip Testing

- _____ 8.2.1 Verify OCB **A-374, OCB A-376** and ACB **C7X200** are **CLOSED**.

8.2.2 Manually operate the **50/51-TH2 A** relay's time overcurrent disk, instantaneous unit and target for operation – verify target operation and the following trips and annunciation. Also record the SCADA alarms in the column below. **DO NOT RESET ANY LOCKOUTS OR CLOSE CIRCUIT BREAKERS AT THIS POINT:**

50/51-TH2 A RELAY		
TRIPS	Verify by placing a check below	RECORD SCADA ALARMS BELOW
86-TB2		
A-376		
A-374		
C7X200		
LOCAL ANNUNCIATION	Verify by placing a check below	
OCB A-376 OPERATION		
OCB A-374 OPERATION		
PCB C7X200 OPERATION		
BFR/BANK 2 BACKUP RELAY TRIP		

8.2.3 Attempt to locally close each of the tripped circuit breakers indicated in 8.2.1. **None should close.**

8.2.4 Request the Dispatcher attempt to remotely close the tripped circuit breakers indicated in 8.2.1. **None should close.**

8.2.5 Reset the **86-TB2** and locally **CLOSE** circuit breakers **A-376, A-374, and C7X200.**

8.2.6 Clear targets and local annunciators and verify with the Dispatcher that associated SCADA alarms have also cleared.

8.2.7 Disable the 86-TB2 functions by **OPENING** the following test switch poles located on device 2M and 4M on 230 kV duplex Panel 3R:

Panel 3R - Device 2M	
Test Switch	Description
Pole 7-8	C7X200 Trip
Pole 9-10-11-12	C7X200 Close Block

Panel 3R - Device 4M	
Test Switch	Description
Pole 1-2	OCB A-376 Trip
Pole 3-4-5-6	OCB A-376 Close Block
Pole 7-8	OCB A-374 Trip
Pole 9-10-11-12	OCB A-374 Close Block

NOTE: THE REMAINING TRIP TESTS INVOLVING THE 86-TB1 RELAY WILL NOT OPERATE CIRCUIT BREAKERS -- ONLY THE 86-TB1 LOCKOUT RELAY OPERATIONS WILL BE OBSERVED.

8.2.8 Manually operate the 50/51-TH2 B relay's time overcurrent disk, instantaneous unit and seal-in target separately -- verify target operation and the following trips and annunciation. Also record the SCADA alarms in the column below.

50/51-TH2 B RELAY		
TRIPS	Verify by placing a check below	RECORD SCADA ALARMS BELOW
86-TB2		
LOCAL ANNUNCIATION	Verify by placing a check below	
BFR/BANK 2 BACKUP RELAY TRIP		

8.2.9 Manually operate the **50/51-TH2 C** relay's time overcurrent disk, instantaneous unit and seal-in target separately -- verify target operation and the following trips and annunciation. Also record the SCADA alarms in the column below.

50/51-TH2 C RELAY		
TRIPS	Verify by placing a check below	RECORD SCADA ALARMS BELOW
86-TB2		
LOCAL ANNUNCIATION	Verify by placing a check below	
BFR/BANK 2 BACKUP RELAY TRIP		

8.2.10 Manually operate the **51G-TH2** residual relay's time overcurrent disk and target for operation -- verify target operation and the following trips and annunciation. Also record the SCADA alarms in the column below.

51G-TH2 RESIDUAL RELAY		
TRIPS	Verify by placing a check below	RECORD SCADA ALARMS BELOW
86-TB2		
LOCAL ANNUNCIATION	Verify by placing a check below	
BFR/BANK 2 BACKUP RELAY TRIP		

8.2.11 Short across terminals 129 and 131 of panel 2F to simulate an operate the 63-T2 sudden pressure relay -- verify target operation and the following trips and annunciation. Also record the SCADA alarms in the column below.

63-T2 SUDDEN PRESSURE RELAY		
TRIPS	Verify by placing a check below	RECORD SCADA ALARMS BELOW
86-TB2		
LOCAL ANNUNCIATION	Verify by placing a check below	
BFR/BANK 2 BACKUP RELAY TRIP		

8.2.12 Manually operate the 51GB-GT2 zig-zag residual relay's time overcurrent disk and target for operation -- verify target operation and the following trips and annunciation. Also record the SCADA alarms in the column below.

51GB-GT2 ZIG-ZAG RESIDUAL RELAY		
TRIPS	Verify by placing a check below	RECORD SCADA ALARMS BELOW
86-TB2		
LOCAL ANNUNCIATION	Verify by placing a check below	
BFR/BANK 2 BACKUP RELAY TRIP		

8.2.13 Manually operate the **50G-76** zig-zag residual alarm relay -- verify target operation and the following trips and annunciation. Also record the SCADA alarms in the column below.

50G-76 ZIG-ZAG RESIDUAL ALARM RELAY		
TRIPS	Verify by placing a check below	RECORD SCADA ALARMS BELOW
NONE		
LOCAL ANNUNCIATION	Verify by placing a check below	
BANK 2 13.8 KV GROUND RELAY		

8.2.14 Manually operate the **51-GT2 A** zig-zag A-phase relay's time overcurrent disk and seal-in target for operation -- verify target operation and the following trips and annunciation. Also record the SCADA alarms in the column below. **DO NOT RESET ANY LOCKOUTS OR CLOSE CIRCUIT BREAKERS AT THIS POINT:**

51-GT2 A RELAY		
TRIPS	Verify by placing a check below	RECORD SCADA ALARMS BELOW
86-T2		
A-376		
A-374		
C7X200		
LOCAL ANNUNCIATION	Verify by placing a check below	
OCB A-376 OPERATION		
OCB A-374 OPERATION		
PCB C7X200 OPERATION		
BUS/BANK 2 DIFFERENTIAL TRIP		

8.2.15 Attempt to locally close each of the tripped circuit breakers indicated in 8.2.14. **None should close.**

- _____ 8.2.16 Request the Dispatcher attempt to remotely close the tripped circuit breakers indicated in 8.2.14. **None should close.**
- _____ 8.2.17 Reset the **86-T2** and locally close circuit breakers **A-376, A-374, and C7X200.**
- _____ 8.2.18 Clear targets and local annunciators and verify SCADA alarms are also cleared.
- _____ 8.2.19 Disable the **86-T2** functions by **OPENING** the following test switch poles located on device 6M on 230 kV duplex Panel **3R**:

Panel 3R - Device 6M	
Test Switch	Description
Pole 7-8	OCB A-376 Trip
Pole 9-10-11-12	OCB A-376 Close Block
Pole 13-14	OCB A-374 Trip
Pole 15-16-17-18	OCB A-374 Close Block
Pole 19-20	C7X200 Trip
Pole 21-22-23-24	C7X200 Close Block

NOTE: THE REMAINING TRIP TESTS INVOLVING THE 86-T2 RELAY WILL NOT OPERATE CIRCUIT BREAKERS -- ONLY THE 86-T2 LOCKOUT RELAY OPERATIONS WILL BE OBSERVED.

- _____ 8.2.20 Manually operate the **51-GT2 B** zig-zag B-phase relay's time overcurrent disk and seal-in target for operation -- verify target operation and the following trips and annunciation. Also record the SCADA alarms in the column below.

51-GT2 B RELAY		
TRIPS	Verify by placing a check below	RECORD SCADA ALARMS BELOW
86-T2		
LOCAL ANNUNCIATION	Verify by placing a check below	
BFR/BANK 2 DIFFERENTIAL TRIP		

8.2.21 Manually operate the 51-GT2 C zig-zag C-phase relay's time overcurrent disk and seal-in target for operation -- verify target operation and the following trips and annunciation. Also record the SCADA alarms in the column below.

51-GT2 C RELAY		
TRIPS	Verify by placing a check below	RECORD SCADA ALARMS BELOW
86-T2		
LOCAL ANNUNCIATION	Verify by placing a check below	
BFR/BANK 2 DIFFERENTIAL TRIP		

8.2.22 Manually operate the 87K2-A ϕ relay's unrestraint and restraint trip to energize the output relay -- verify target operation and the following trips and annunciation. Also record the SCADA alarms in the column below.

87K2-A ϕ RELAY		
TRIPS	Verify by placing a check below	RECORD SCADA ALARMS BELOW
86-T2		
LOCAL ANNUNCIATION	Verify by placing a check below	
BFR/BANK 2 DIFFERENTIAL TRIP		

8.2.23 Manually operate the 87K2-B ϕ relay's unrestraint and restraint trip to energize the output relay -- verify target operation and the following trips and annunciation. Also record the SCADA alarms in the column below.

87K2-B ϕ RELAY		
TRIPS	Verify by placing a check below	RECORD SCADA ALARMS BELOW
86-T2		
LOCAL ANNUNCIATION	Verify by placing a check below	
BFR/BANK 2 DIFFERENTIAL TRIP		

8.2.24 Manually operate the 87K2-C ϕ relay's unrestraint and restraint trip to energize the output relay -- verify target operation and the following trips and annunciation. Also record the SCADA alarms in the column below.

87K2-C ϕ RELAY		
TRIPS	Verify by placing a check below	RECORD SCADA ALARMS BELOW
86-T2		
LOCAL ANNUNCIATION	Verify by placing a check below	
BFR/BANK 2 DIFFERENTIAL TRIP		

8.3 230 kV Bus #2 Trip Testing

8.3.1 Manually operate the **87B2-A ϕ** relay's 87L and 87H plunger units for operation -- verify target operation and the following trips and annunciation. Also record the SCADA alarms in the column below.

87B2-Aϕ RELAY		
TRIPS	Verify by placing a check below	RECORD SCADA ALARMS BELOW
86-T2		
LOCAL ANNUNCIATION	Verify by placing a check below	
BFR/BANK 2 DIFFERENTIAL TRIP		

8.3.2 Manually operate the **87B2-B ϕ** relay's 87L and 87H plunger units for operation -- verify target operation and the following trips and annunciation. Also record the SCADA alarms in the column below.

87B2-Bϕ RELAY		
TRIPS	Verify by placing a check below	RECORD SCADA ALARMS BELOW
86-T2		
LOCAL ANNUNCIATION	Verify by placing a check below	
BFR/BANK 2 DIFFERENTIAL TRIP		

8.3.3 Manually operate the 87B2-C ϕ relay's 87L and 87H plunger units for operation – verify target operation and the following trips and annunciation. Also record the SCADA alarms in the column below.

87B2-C ϕ RELAY		
TRIPS	Verify by placing a check below	RECORD SCADA ALARMS BELOW
86-T2		
LOCAL ANNUNCIATION	Verify by placing a check below	
BFR/BANK 2 DIFFERENTIAL TRIP		

8.4 230 kV A-376 Breaker Failure Relay Trip Testing

NOTE: THE A-376 BREAKER FAILURE SCHEME WILL BE TESTED AT A LATER DATE IN WHC-SD-LL-ATP-026, CENRTC #2F3E0A ATP FOR K-TAP OCBs.

8.5 230 kV A-376 JBCG Line Relaying Trip Testing

NOTE: OCB A-376 WILL OPEN AFTER EACH STEP IN THIS SECTION. CLOSE OCB A-376 AND RESET ANY ANNUNCIATORS AFTER THE COMPLETION OF EACH STEP.

8.5.1 Manually operate the directional time overcurrent and seal-in units on the 67GB-76 directional ground overcurrent relay – verify target operation and the following trips and annunciation. Also record the SCADA alarms in the column below.

67GB-76 DIRECTIONAL GROUND OVERCURRENT RELAY (DIRECTIONAL TIME OVERCURRENT ELEMENT)		
TRIPS	Verify by placing a check below	RECORD SCADA ALARMS BELOW
A-376		
LOCAL ANNUNCIATION	Verify by placing a check below	
OCB A-376 OPERATION		

8.5.2 Manually operate the instantaneous overcurrent, non-directional instantaneous, directional and seal-in units on the **67GB-76** directional ground overcurrent relay – verify target operation and the following trips and annunciation. Also record the SCADA alarms in the column below.

67GB-76 DIRECTIONAL GROUND OVERCURRENT RELAY (DIRECTIONAL INSTANTANEOUS OVERCURRENT ELEMENT)		
TRIPS	Verify by placing a check below	RECORD SCADA ALARMS BELOW
A-376		
LOCAL ANNUNCIATION	Verify by placing a check below	
OCB A-376 OPERATION		

8.5.3 Manually operate the nondirectional instantaneous overcurrent element and seal-in units on the **67GB-76** directional ground overcurrent relay – verify target operation and the following trips and annunciation. Also record the SCADA alarms in the column below.

67GB-76 DIRECTIONAL GROUND OVERCURRENT RELAY (NONDIRECTIONAL INSTANTANEOUS OVERCURRENT ELEMENT)		
TRIPS	Verify by placing a check below	RECORD SCADA ALARMS BELOW
A-376		
LOCAL ANNUNCIATION	Verify by placing a check below	
OCB A-376 OPERATION		

8.6 230 kV A-376 SEL 121G-5 Line Relaying Trip Testing

NOTE: OCB A-376 WILL OPEN AFTER EACH STEP IN THIS SECTION. CLOSE OCB A-376 AND RESET ANY ANNUNCIATORS AFTER THE COMPLETION OF EACH STEP.

8.6.1 Disable the **SEL Set #1** Direct and Permissive Transfer Trip (μW) functions by **OPENING** the following test switch poles located on device 3G on 230 kV duplex Panel 3F:

Panel 3F - Device 3G	
Test Switch	Description
Pole 5-6	Direct Transfer Trip (μW) to A8 and Ashe
Pole 7-8	Permissive Transfer Trip (μW) to A8 and Ashe

8.6.2 Disable the **SEL Set #2** Direct and Permissive Transfer Trip (μW) functions by **OPENING** the following test switch poles located on device 6G on 230 kV duplex Panel 3F:

Panel 3F - Device 6G	
Test Switch	Description
Pole 5-6	Direct Transfer Trip (μW) to A8 and Ashe
Pole 7-8	Permissive Transfer Trip (μW) to A8 and Ashe

8.6.3 Simulate a trip output by shorting across terminals 13 and 14 of the SEL Set #1 Relay -- verify target operation and the following trips and annunciation. Also record the SCADA alarms in the column below.

SEL 121G-5 RELAY SET #1 -- TRIP CONTACT		
TRIPS	Verify by placing a check below	RECORD SCADA ALARMS BELOW
A-376		
LOCAL ANNUNCIATION	Verify by placing a check below	
OCB A-376 OPERATION		

8.6.4 Simulate a trip output by shorting across terminals 13 and 14 of the SEL Set #2 Relay -- verify target operation and the following trips and annunciation. Also record the SCADA alarms in the column below.

SEL 121G-5 RELAY SET #2 -- TRIP CONTACT		
TRIPS	Verify by placing a check below	RECORD SCADA ALARMS BELOW
A-376		
LOCAL ANNUNCIATION	Verify by placing a check below	
OCB A-376 OPERATION		

8.7 Local Trip Tests Acceptance

8.7.1 The **Lead Relay Technician** and **EUE System Protection Engineer** shall sign below indicating tests have been completed successfully.

Lead Relay Technician

Date

EUE System Protection Engineer

Date

9.0 A-376/A8/ASHE μ WAVE TRIP TEST

NOTE: μ WAVE TRIP TESTING BETWEEN SUBSTATIONS A7, A8 AND ASHE WILL BE PERFORMED UNDER JCS WORK PACKAGE 6B-92-0040 & WHC-SD-LL-ATP-023 (A-382 RELAY MODIFICATIONS AND ATP).

10.0 DISCREPANCIES

Discrepancies and there corrective actions shall be listed on the following page.
Make additional sheets if needed.

