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ENGINEERING DATA TRANSMITTAL

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2	1	Design Authority	JM Hache	6/8/99	S2-12	3		Scott Baker			S2-12
2	1	Design Agent	JM Hache	6/8/99	S2-12	3		Mike Borchers			S2-12
		Cog. Eng.				3		Bert Winschell			S2-12
2	1	Cog. Mgr.	RL Fritz	6/8/99	S2-12	3		Dispatch			S3-55
		QA									
		Safety									
		Env.									

18. Signature of EDT Originator JM Hache <i>JM Hache</i> 6/8/99		19. Authorized Representative for Receiving Organization _____ Date		20. Design Authority/Cognizant Manager JM Hache <i>JM Hache</i> 6/8/99		21. DOE APPROVAL (if required) Ctrl No. _____ ☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments	
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ACCEPTANCE TEST PROCEDURE FOR REMOVAL OF CS1K CIRCUIT SWITCHER BLOCK/TRIP SCHEMES

JM Hache

DynCorp Tri-City Services, Inc., Richland, WA 99352
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Abstract: This supporting document provides a detailed process to test the functions of the circuit switcher, protective relays, alarms, SCADA and 125VDC control logic of 115kV and 13.8kV systems at B3S4 substation following the removal of trip and blocking schemes to Transformer #1 Circuit Switcher B594.

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HNF-4560

Acceptance Test Procedure for Removal of CS1K Circuit Switcher Block/Trip Schemes

Revision 0 June 07,1999

This supporting document contains the documentation of the test to be performed for the modifications to remove trip and blocking schemes from circuit switcher CS1K (B594) at Substation B3S4.

Prepared by:

DynCorp Tri-Cities services, Inc.
P.O. Box 1400
Richland, Washington 99352

1. PURPOSE

This ATP is to test the functions of the circuit switcher, protective relays, alarms, SCADA, and 125VDC control logic of 115kV and 13.8kV system at B3S4 following the removal of trip and blocking schemes to the Transformer #1, Circuit Switcher B594. Modifications are to be performed using ECN 647305 per Work Package 6B-98-1579/M. This test is purely functional in nature and does not examine any other system characteristics.

2. SCOPE

This acceptance test procedure shall only be used in conjunction with work package 6B-98-1579/M. This test is to be performed under the bus outage described in the work instructions of work package 6B-98-1579/M.

3. QUALIFICATIONS

The individuals performing this test shall be qualified electricians, substation electricians or relay technicians, knowledgeable in substation and switchgear relays and control circuitry. A relay technician(s) is preferred.

4. METHOD OF EXAMINATION

The method of examination shall be by operation of devices or placement of jumpers and visually observing results of such operation, and circuit continuity testing. There are no calibration requirements for the test equipment, only go-no-go indication is required.

5. ACCEPTANCE CRITERIA

Each step of the ATP shall be performed in sequence and initialed in the space provided by the performing individual (relay technician) when successfully completed. Test shall be stopped for any steps that cannot be completed, verified, or performed as written, or resulting conditions are not realized as written. In such case Engineering Services shall be notified for evaluation as to whether to correct on the spot, accept the deficiency before going on or correct deficiency at a later time. Each deficiency and its disposition shall be logged in the log provided in the Discrepancies or Problems section.

6. REFERENCES

- 6.1 Copy of the latest revision of the 115kV and 13.8kV B3S4 one-line, three-line, control and interconnection drawings.

- One Line Diagrams H-3-300406 sheet 1
 H-3-300406 sheet 2
 H-3-43830 sheet 1
- Three Line Diagrams H-3-48882 sheet 5
 H-3-43830 sheet 2
 H-3-43830 sheet 3
- Control Dwgs H-3-48882 sheet 14
 H-3-48882 sheet 16

- Annunciator Dwgs
- H-3-48882 sheet 21
H-3-43830 sheet 4
H-3-48882 sheet 23
H-3-48882 sheet 24

6.2 ECN 647304

7. ACCEPTANCE TEST PROCEDURE

- 7.1 The Relay Technician shall be responsible for initialing each step as it is successfully completed, regardless of additional signatures or initialing requirements indicated in each step.
- 7.2 It is the responsibility of the Relay Technician to report any discrepancies or problems associated with the following steps to Engineering Services. In addition to the notification, document discrepancies in Section 13.
- 7.3 This procedure consists of 4 tests separated by sections.
- Section 8. --Visual and De-energized Tests
 - Section 9. -- Energization of DC Circuits
 - Section 10. --Testing Alarm Circuits
 - Section 11. --Testing Lockout Circuits

This ATP will essentially test and verify the integrity of wiring and control circuits associated with the removal of trip and trip blocking signals to circuit switcher CS1K, B594.

8. VISUAL AND DE-ENERGIZED TESTS

- _____ 8.1 Re-verify CT circuits shorted in work instructions have been removed. (Work instructions 5.2.5)
- _____ 8.2 Re-verify continuity in XFMR #1, 115kV, 51TIBU over current relay CT circuits. Ensure circuit is grounded at one point only. (Work instructions 5.2.6)
- _____ 8.3 Perform point to point wiring check using ECN 647305 and work instructions used to perform modifications.
- _____ 8.4 Verify 125VDC circuits that were worked on contain no short circuits.

9. ENERGIZATION OF DC CIRCUITS

- _____ 9.1 **Notify Dispatch** At main 125VDC panel, close the 125VDC 20A circuit breakers for the Annunciator. (H-3-43832, Sht 1) Verify DC power has been restored. Clear alarms and annunciator.
- _____ 9.2 **Notify Dispatch** At panel 5, close the 125VDC circuit breakers CBBN2 (device AL bus #2 lockout). Verify DC power has been restored. Clear alarms and annunciator.
- _____ 9.2.1 Check for indicating lights for B1020 @ panel 3. If B1020 is open, then the green light should be lit.
- _____ 9.3 **Notify Dispatch** At panel 5A, 125VDC circuit breakers CBFR2 (device DRCS-1K, -6K, -7K BFR, timer) do not need to be closed. They can be left open. They may be closed and left closed if required to clear alarm. These breakers feed the breaker failure

timers for Bank 6 & 7, Bank #6 and #7 have been permanently taken out of service.
Clear alarms and annunciator.

- _____ 9.4 **Notify Dispatch** At 125VDC panel, close the 125VDC 20A circuit breakers #14 for Circuit Switcher CS1K Motor Bus. (H-3-43832, Sht 1) Clear alarms and annunciator. Verify DC power has been restored.
 - _____ 9.4.1 Verify 89CS/T1 white light comes on, panel 4, for DC power available to Circuit Switcher B594.
- _____ 9.5 **Notify Dispatch** At panel 4A, close the 125VDC circuit breakers CBTB1 (device DQ, Bank 1 Trouble Lockout). Verify DC power has been restored. Clear alarms and annunciator.
- _____ 9.6 **Notify Dispatcher** Install 125VDC fuses 3UB, in 13.8kV unit 3F. Verify DC power has been restored.

10. TESTING ALARM CIRCUITS

- _____ 10.1 Momentarily jumper across terminals 2 & 3 of 74-7/DX (Bank #7 BFR alarm relay) @ panel 6A.
- _____ 10.2 Acknowledge and reset:
 - _____ 10.2.1 **115KV BUS NO 2 BFR** annunciator alarm
 - _____ 10.2.2 **SCADA Annunciator Drop** Alarm at dispatch.
- _____ 10.3 Momentarily jumper across terminals 2 & 3 of 74-5/DX (Bus No 2 BFR alarm relay) @ panel 6A.
- _____ 10.4 Acknowledge and reset:
 - _____ 10.4.1 **115KV BUS NO 2 BFR** annunciator alarm
 - _____ 10.4.2 **SCADA Annunciator Drop** Alarm at dispatch.
- _____ 10.5 Momentarily jumper across terminals 2 & 3 of 74-6/DV (Bank #6 BFR alarm relay) @ panel 5A.
- _____ 10.6 Acknowledge and reset:
 - _____ 10.6.1 **115KV BUS NO 2 BFR** annunciator alarm
 - _____ 10.6.2 **SCADA Annunciator Drop** Alarm at dispatch.
- _____ 10.7 Momentarily jumper across terminals ZZ1 & ZZ2 of TBZZ @ panel 5A.
- _____ 10.8 Acknowledge and reset:
 - _____ 10.8.1 **CIRCUIT SWITCHER 2, 6, 7 CLOSE BUS NOT AVAILABLE** SCADA alarm and **SCADA Annunciator Drop** alarm at dispatch.
 - _____ 10.8.2 **115KV OCB AND CIRCUIT SWITCHER CLOSE BUS ACB OPEN** annunciator alarm.
- _____ 10.9 Momentarily jumper across terminals ZZ7 & ZZ8 of TBZZ @ panel 4A.
- _____ 10.10 Acknowledge and reset:
 - _____ 10.10.1 **CKT SWITCHER MAIN CONTROL & XFMR TRIP BUS NOT AVAILABLE** SCADA alarm and **SCADA Annunciator Drop** alarm at dispatch.
 - _____ 10.10.2 **XFMR 1, 6, 7 CONTROL BUS ACB OPEN** annunciator alarm.
- _____ 10.11 Momentarily jumper across terminals ZZ10 & ZZ11 of TBZZ @ panel 4A.
- _____ 10.12 Acknowledge and reset:

- _____ 10.12.1 **CKT SWITCHER MAIN CONTROL & XFMR TRIP BUS NOT AVAILABLE** SCADA alarm and SCADA **Annunciator Drop** alarm at dispatch.
- _____ 10.12.2 **XFMR 1, 6, 7 CONTROL BUS ACB OPEN** annunciator alarm.

11. TESTING LOCKOUT CIRCUITS

11.1 86T6

- _____ 11.1.1 Verify Circuit Switcher B-589 for XFMR Bank #6 is open.
- _____ 11.1.2 Trip 86T6 lockout relay
- _____ 11.1.3 Verify Annunciator and SCADA alarms are only devices to operate. No other devices should have been actuated.
- _____ 11.1.4 Acknowledge alarms:
 - _____ 11.1.4.1 **TRANSFORMER #6 LOCKOUT RELAY** annunciator alarm.
 - _____ 11.1.4.2 **SCADA Annunciator Drop** alarm at dispatch.
- _____ 11.1.5 Reset 86T6 lockout.
- _____ 11.1.6 Reset the alarms or verify alarms cleared:
 - _____ 11.1.6.1 **TRANSFORMER #6 LOCKOUT RELAY** annunciator alarm.
 - _____ 11.1.6.2 **SCADA Annunciator Drop** alarm at dispatch.

11.2 86TB6

- _____ 11.2.1 Verify Circuit Switcher B-589 for XFMR Bank #6 is open.
- _____ 11.2.2 Trip 86TB6 lockout relay
- _____ 11.2.3 Verify Annunciator and SCADA alarms are only devices to operate. No other devices should have been actuated.
- _____ 11.2.4 Acknowledge alarms:
 - _____ 11.2.4.1 **TRANSFORMER #6 LOCKOUT RELAY** annunciator alarm.
 - _____ 11.2.4.2 **SCADA Annunciator Drop** alarm at dispatch.
- _____ 11.2.5 Reset 86TB6 lockout.
- _____ 11.2.6 Reset the alarms or verify alarms cleared:
 - _____ 11.2.6.1 **TRANSFORMER #6 LOCKOUT RELAY** annunciator alarm.
 - _____ 11.2.6.2 **SCADA Annunciator Drop** alarm at dispatch.

11.3 86T7

- _____ 11.3.1 Verify Circuit Switcher B-592 for XFMR Bank #7 is open.
- _____ 11.3.2 Trip 86T7 lockout relay
- _____ 11.3.3 Verify Annunciator and SCADA alarms are only devices to operate. No other devices should have been actuated.

- _____ 11.3.4 Acknowledge alarms:
 - _____ 11.3.4.1 **TRANSFORMER #7 LOCKOUT RELAY** annunciator alarm.
 - _____ 11.3.4.2 **SCADA Annunciator Drop** alarm at dispatch.
- _____ 11.3.5 Reset 86T7 lockout.
- _____ 11.3.6 Reset the alarms or verify alarms cleared:
 - _____ 11.3.6.1 **TRANSFORMER #7 LOCKOUT RELAY** annunciator alarm.
 - _____ 11.3.6.2 **SCADA Annunciator Drop** alarm at dispatch.

11.4 86TB7

- _____ 11.4.1 Verify Circuit Switcher B-592 for XFMR Bank #7 is open.
- _____ 11.4.2 Trip 86TB7 lockout relay
- _____ 11.4.3 Verify Annunciator and SCADA alarms are only devices to operate. No other devices should have been actuated.
- _____ 11.4.4 Acknowledge alarms:
 - _____ 11.4.4.1 **TRANSFORMER #7 LOCKOUT RELAY** annunciator alarm.
 - _____ 11.4.4.2 **SCADA Annunciator Drop** alarm at dispatch.
- _____ 11.4.5 Reset 86TB7 lockout.
- _____ 11.4.6 Reset the alarms or verify alarms cleared:
 - _____ 11.4.6.1 **TRANSFORMER #7 LOCKOUT RELAY** annunciator alarm.
 - _____ 11.4.6.2 **SCADA Annunciator Drop** alarm at dispatch.

11.5 86T1 (Transformer Differential Relay, 87T1)

- _____ 11.5.1 Verify source and load sides of Circuit Switcher B-594 for XFMR Bank #1 are de-energized.
- _____ 11.5.2 Close Circuit Switcher B-594 for XFMR Bank #1.
- _____ 11.5.3 Rack circuit breaker C3X100F into the "TEST" position.
- _____ 11.5.4 Close C3X100F in Test Position.
- _____ 11.5.5 Rack circuit breaker C3X100R into the "TEST" position.
- _____ 11.5.6 Close C3X100R in Test Position.
- _____ 11.5.7 Verify B1020 is OPEN!
- _____ 11.5.8 Trip 86T1 lockout relay using the 87T1 relay.
- _____ 11.5.9 Verify Circuit Switcher B-594 for XFMR Bank #1 does **NOT** open.
- _____ 11.5.10 Verify trip of the 86B2 lockout relay.
- _____ 11.5.11 Verify trip of the 86100 lockout relay.

- _____ 11.5.12 Verify trip of C3X100F breaker
- _____ 11.5.13 Verify trip of C3X100R breaker
- _____ 11.5.14 Verify trip of 86TB6
- _____ 11.5.15 Verify trip of 86TB7

NOTE: OCB B1113, OCB B1116, Circuit Switcher B589 for Bank #6, and Circuit Switcher B592 for Bank #7 will not trip; they are already open.
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- _____ 11.5.16 Acknowledge alarms:
 - _____ 11.5.16.1 **TRANSFORMER #6 LOCKOUT RELAY** annunciator alarm.
 - _____ 11.5.16.2 SCADA **Annunciator Drop** alarm at dispatch.
 - _____ 11.5.16.3 **TRANSFORMER #7 LOCKOUT RELAY** annunciator alarm.
 - _____ 11.5.16.4 SCADA **Annunciator Drop** alarm at dispatch.
 - _____ 11.5.16.5 **TRANSFORMER #1 LOCKOUT RELAY** annunciator alarm.
 - _____ 11.5.16.6 SCADA **Annunciator Drop** alarm at dispatch.
 - _____ 11.5.16.7 **115KV BUS NO 2 LOCKOUT RELAY**
 - _____ 11.5.16.8 SCADA **Annunciator Drop** alarm at dispatch.
 - _____ 11.5.16.9 **C3X100 FRONT OPERATION** annunciator alarm
 - _____ 11.5.16.10 SCADA **Annunciator Drop** alarm at dispatch.
 - _____ 11.5.16.11 **C3X100 REAR OPERATION** annunciator alarm
- _____ 11.5.17 Attempt to close and note they do NOT close:
 - _____ 11.5.17.1 OCB B1113
 - _____ 11.5.17.2 OCB B1116
 - _____ 11.5.17.3 C3X100F
 - _____ 11.5.17.4 C3X100R
- _____ 11.5.18 Open Circuit Switcher B-594 for XFMR Bank #1
- _____ 11.5.19 Close Circuit Switcher B-594 for XFMR Bank #1
- _____ 11.5.20 Reset 86T1 lockout.
- _____ 11.5.21 Reset 86B2 lockout.
- _____ 11.5.22 Reset or clear alarms:
 - _____ 11.5.22.1 **TRANSFORMER #1 LOCKOUT RELAY** annunciator alarm.
 - _____ 11.5.22.2 SCADA **Annunciator Drop** alarm at dispatch.
 - _____ 11.5.22.3 **115KV BUS NO 2 LOCKOUT RELAY**
 - _____ 11.5.22.4 SCADA **Annunciator Drop** alarm at dispatch.
- _____ 11.5.23 Attempt to close C3X100F and C3X100R and note they do not close.

11.6 86TB1 (Overcurrent Time Backup Relay, 51/T1BU)

- _____ 11.6.1 Verify source and load sides of Circuit Switcher B-594 for XFMR Bank #1 are de-energized.
- _____ 11.6.2 Verify Circuit Switcher B-594 for XFMR Bank #1 is closed.

- _____ 11.6.3 Verify B1020 is OPEN!
- _____ 11.6.4 Trip 86TB1 lockout relay using the 51/T1BU relay.
- _____ 11.6.5 Verify Circuit Switcher B-594 for XFMR Bank #1 does NOT open.
- _____ 11.6.6 Verify trip of the 86B2 lockout relay.

NOTE: OCB B1113, OCB B1116, Circuit Switcher B589 for Bank #6, Circuit Switcher B592 for Bank #7, C3X100 F&R will not trip; they are already open.

NOTE: 86-100, 86TB6 and 86TB7 lockouts will not trip; they were not reset.

- _____ 11.6.7 Acknowledge alarms:
 - _____ 11.6.7.1 **TRANSFORMER #1 LOCKOUT RELAY** annunciator alarm.
 - _____ 11.6.7.2 SCADA **Annunciator Drop** alarm at dispatch.
 - _____ 11.6.7.3 **115KV BUS NO 2 LOCKOUT RELAY**
 - _____ 11.6.7.4 SCADA **Annunciator Drop** alarm at dispatch.
- _____ 11.6.8 Open Circuit Switcher B-594 for XFMR Bank #1
- _____ 11.6.9 Close Circuit Switcher B-594 for XFMR Bank #1
- _____ 11.6.10 Reset 86TB1 lockout.
- _____ 11.6.11 Reset 86B2 lockout.
- _____ 11.6.12 Reset or clear alarms:
 - _____ 11.6.12.1 **TRANSFORMER #1 LOCKOUT RELAY** annunciator alarm.
 - _____ 11.6.12.2 SCADA **Annunciator Drop** alarm at dispatch.
 - _____ 11.6.12.3 **115KV BUS NO 2 LOCKOUT RELAY**
 - _____ 11.6.12.4 SCADA **Annunciator Drop** alarm at dispatch.
- _____ 11.6.13 Attempt to close C3X100F and C3X100R and note they do not close.

11.7 86TB1 (Overcurrent Ground Backup Relay, 51/GB)

- _____ 11.7.1 Trip 86TB1 lockout relay using the 51/GB relay.
- _____ 11.7.2 Verify Circuit Switcher B-594 for XFMR Bank #1 does NOT open.
- _____ 11.7.3 Verify trip of the 86B2 lockout relay.

NOTE: OCB B1113, OCB B1116, Circuit Switcher B589 for Bank #6, Circuit Switcher B592 for Bank #7, C3X100 F&R will not trip; they are already open.

NOTE: 86-100, 86TB6 and 86TB7 lockouts will not trip; they were not reset.

- _____ 11.7.4 Acknowledge alarms:
 - _____ 11.7.4.1 **TRANSFORMER #1 LOCKOUT RELAY** annunciator alarm.

- _____ 11.7.4.2 SCADA Annunciator Drop alarm at dispatch.
- _____ 11.7.4.3 **115KV BUS NO 2 LOCKOUT RELAY**
- _____ 11.7.4.4 SCADA Annunciator Drop alarm at dispatch.

- _____ 11.7.5 Reset 86TB1 lockout.
- _____ 11.7.6 Reset 86B2 lockout.

- _____ 11.7.7 Reset or clear alarms:
 - _____ 11.7.7.1 **TRANSFORMER #1 LOCKOUT RELAY** annunciator alarm.
 - _____ 11.7.7.2 SCADA Annunciator Drop alarm at dispatch.
 - _____ 11.7.7.3 **115KV BUS NO 2 LOCKOUT RELAY**
 - _____ 11.7.7.4 SCADA Annunciator Drop alarm at dispatch.

12. TESTING IS COMPLETE

- _____ 12.1 Reset or verify reset of lockouts in the following order:
 - _____ 12.1.1 86T1
 - _____ 12.1.1 86TB1
 - _____ 12.1.1 86B2
 - _____ 12.1.1 86TB6
 - _____ 12.1.1 86TB7
 - _____ 12.1.1 86-100

- _____ 12.2 Reset or clear all alarms and relay targets.

- _____ 12.3 Insure that all poles of test switches on any affected panels are closed or in their normal positions.

- _____ 12.4 Return the station to pre-test conditions:
OCBs 1113 & 1116 are open, B-1020 is open, and 13.8kV low side breakers C3X100F&R are open and racked out. Line disconnect-switches B-1111 and B-1117 are open. E3X60 and E3X70 are locked and tagged open.

- _____ 12.5 Contact Dispatcher and turn station over to dispatch for returning station to normal configuration.

13. DISCREPANCIES OR PROBLEMS

- 13.1 Document discrepancies or problems with ATP and/or equipment in the following table. Attach additional pages if necessary.

[illegible]