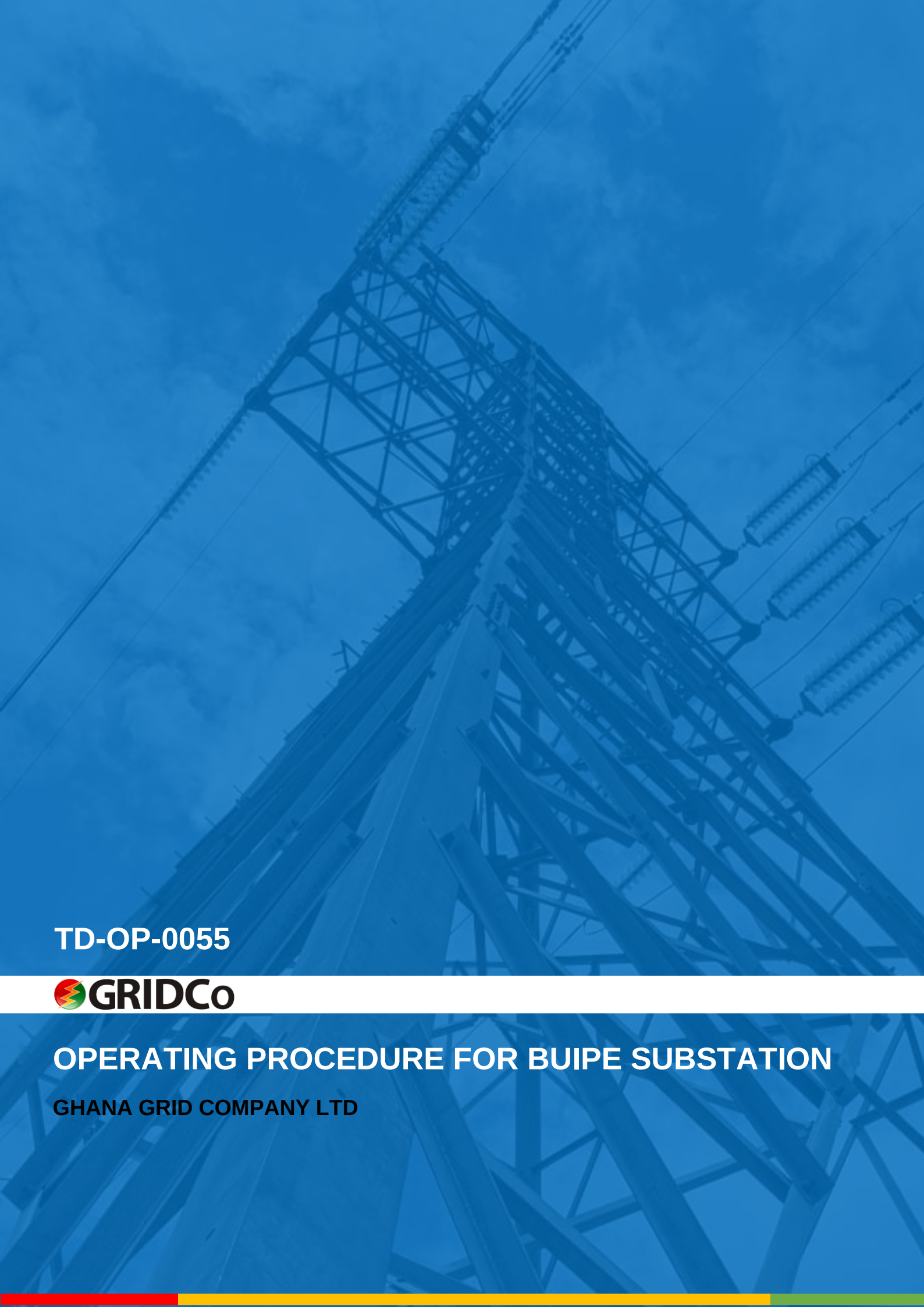

TD-OP-0055

GRIDCo

OPERATING PROCEDURE FOR BUIPE SUBSTATION

GHANA GRID COMPANY LTD

Title:	**OPERATING PROCEDURE FOR BUIPE SUBSTATION (BP55)**		
Issued To:	Director, System Operations Director, NNS Manager, SCC Manager, Dispatch Operations Area Manager, Tamale Operating Staff, Tamale Area Maintenance Staff, Tamale Area Dispatch Staff, SCC	**Number:**	TD-OP-0055
		Subject Area:	Operating
		Issue Date:	Trial
		Origin:	Technical Services
Key Words:	Take Out, Isolate, Prepare, Energize, Restore, Automatic Outage		

Contents

1. Purpose

This directive specifies the operations to be carried out to take out of service, isolate or restore equipment at BP55 Substation to service for planned and auto outages.

2. Scope

The directive will be used by Operators at Tamale Operating Area and System Control Center (SCC) for operation of equipment at BP55 Substation.

3. Procedure

3.1. To take KP3BP line out of service

SCC shall carry out (or advise the BP55 Operator to carry out) the following:

- Open 55L3A and 55L1L3 breakers

SCC shall carry out (or advise the KP56 Operator to carry out) the following:

- Open 56DL3 and 56L3L4 breakers
- Check for no potential on KP3BP line

3.2. To take out, isolate and de-energize KP3BP line for work

- BP55 Operator shall request for Station Guarantee from KP56

SCC shall carry out (or advise the BP55 Operator to carry out) the following:

- Open 55L3A and 55L1L3 breakers

SCC shall carry out (or advise KP56 Operator to carry out) the following:

- Open 56DL3 and 56L3L4 breakers
- Check for no potential on KP3BP line

SCC shall advise KP56 Operator to carry out the following:

- Open 56DL3-L3 and 56L3L4-L3 disconnect switches and turn off its 125Vdc supply
- Close 56KP3BP-G ground disconnect switch

SCC shall advise BP55 Operator to carry out the following:

- Open 55L3A-L3 and 55L1L3-L3 disconnect switches and turn off its 125Vdc supply

- Close 55KP3BP-G ground disconnect switch

3.3. To restore KP3BP line to service after work

3.3.1. Prepare KP3BP line for restoration:

BP55 Operator shall:

- Advise SCC when work on the line has been completed and permit(s) surrendered (including all Station Guarantees)

- Check for no potential on KP3BP line

SCC shall advise KP56 Operator to carry out the following:

- Check opened 56DL3 and 56L3L4 breakers

- Open 56KP3BP-G ground disconnect switch

- Turn on 125Vdc supply and close 56DL3-L3 and 56L3L4-L3 disconnect switches

SCC shall advise BP55 Operator to carry out the following:

- Check opened 55L3A and 55L1L3 breakers

- Open 55KP3BP-G ground disconnect switch

- Turn on 125Vdc supply and close 55L3A-L3 and 55L1L3-L3 disconnect switches

3.3.2. Restoration of KP3BP line:

SCC shall:

- Advise the KP56 and BP55 Operators of readiness to restore KP3BP line to service

- Close (or advise the KP56 Operator to close) 56DL3 and 56L3L4 breakers

- Close (or advise the BP55 Operator to close) 55L3A and 55L1L3 breakers

3.4. To restore KP3BP line to service after automatic outage

If KP3BP line trips auto due to fault:

BP55 Operator shall:

- Advise SCC about the outage
- Acknowledge all alarms and record relay operation details
- Reset relay targets
- Report relay operation details to SCC

SCC shall:

- Energize (or advise the KP56 Operator to energize) the line **ONCE** by closing 56DL3 and 56L3L4 breakers
- Close (or advise the BP55 Operator to close) 55L3A and 55L1L3 breakers

BP55 Operator shall:

- Advise the Supervisor/Area Manager of operation above
- Advise maintenance men to patrol the line if the operation above is not successful

3.5. To take BP1AD line out of service

SCC shall carry out (or advise the BP55 Operator to carry out) the following:

- Open 55L1D and 55L1L3 breakers.

SCC shall carry out (or advise the AD81 Operator to carry out) the following:

- Open 81L1A and 81L1T2 breakers
- Check for no potential on BP1AD line

3.6. To take out, isolate and de-energize BP1AD line for work

- BP55 Operator shall request for Station Guarantee from AD81

SCC shall carry out (or advise the BP55 Operator to carry out) the following:

- Open 55L1D and 55L1L3 breakers

SCC shall carry out (or advise AD81 Operator to carry out) the following:

- Open 81L1A and 81L1T2 breakers
- Check for no potential on BP1AD line

SCC shall advise AD81 Operator to carry out the following:

- Open 81L1A-L1 and 81L1T2-L1disconnect switches and turn off its 125Vdc supply
- Close 81BP1AD-G ground disconnect switch

SCC shall advise BP55 Operator to carry out the following:

- Open 55L1D-L1 and 55L1L3-L1 disconnect switches and turn off its 125Vdc supply
- Close 55BP1AD-G ground disconnect switch

3.7. To restore BP1AD line to service after work

3.7.1. Prepare BP1AD line for restoration:

BP55 Operator shall:

- Advise SCC when work on the line has been completed and permit(s) surrendered (including all Station Guarantees)
- Check for no potential on BP1AD line

SCC shall advise AD81 Operator to carry out the following:

- Check opened 81L1A and 81L1T2 breakers
- Open 81BP1AD-G ground disconnect switch
- Turn on 125Vdc supply and close 81L1A-L1 and 81L1T2-L1disconnect switches

SCC shall advise BP55 Operator to carry out the following:

- Check opened 55L1D and 55L1L3 breakers
- Open 55BP1AD-G ground disconnect switch
- Turn on 125Vdc supply and close 55L1D-L1 and 55L1L3-L1 disconnect switches disconnect switch

3.7.2. Restoration of BP1AD line to service:

SCC shall:

- Advise the AD81 and BP55 Operators of readiness to restore BP1AD line to service
- Close (or advise the AD81 Operator to close) 81L1A and 81L1T2 breakers
- Close (or advise the BP55 Operator to close) 55L1D and 55L1L3 breakers

3.8. To restore BP1AD line to service after automatic outage

If BP1AD line trips auto due to fault:

BP55 Operator shall:

- Advise SCC about the outage
- Acknowledge all alarms and record relay operation details
- Reset relay targets
- Report relay operation details to SCC

SCC shall:

- Energize (or advise the AD81 Operator to energize) the line **ONCE** by closing 81L1A and 81L1T2 breakers
- Close (or advise the BP55 Operator to close) 55L1D and 55L1L3 breakers

BP55 Operator shall:

- Advise the Supervisor/Area Manager of operation above
- Advise maintenance men to patrol the line if the operation above is not successful

3.9. To isolate 55T1 Transformer for work

SCC shall advise BP55 Operator to carry out the following:

- Inform customers about readiness to take off 55T1 bank
- Request customers on 55T1 Bank to take off their load
- Transfer Station Service supply from AC1 to Standby Generator

- Open AC1 Contactor/MCB to take off supply to 55T1 transformer auxiliaries

SCC shall carry out (or advise BP55 Operator to carry out) the following:

- Open 55YF1 breaker
- Open 55YF2 breaker
- Open 55T1SC1 breaker
- Open 55L3A and 55L1D breakers
- Check for no potential on 55T1 Bank
- Open 55T1-A disconnect switch and turn off its 125Vdc supply
- Open 55YF1-Y disconnect switch
- Open 55YF2-Y disconnect switch
- Open 55YSC1-Y disconnect switch
- Open AC control MCB to 55T1 auxiliaries
- Open 125V DC MCB to 55T1 primary and secondary protection and tag with PC13

3.10. To restore 55T1 Bank to service after work

3.10.1. Prepare 55T1 Bank for restoration:

BP55 Operator shall:

- Advise SCC when work on the bank has been completed and permit(s) surrendered (including all Station Guarantees)
- Check for no potential on 55T1 Bank and temporary grounds removed
- Close 55YSC1-Y disconnect switch
- Close 55YF1-Y disconnect switch
- Close 55YF2-Y disconnect switch
- Turn on 125Vdc supply and close 55T1-A disconnect switch
- Close AC control MCB to 55T1 auxiliaries
- Close 125V DC MCB to 55T1 primary and secondary protection and remove PC13 tag

- Advise SCC of readiness to restore 55T1 Bank to service

3.10.2. Restoration of 55T1 Bank to service:

- SCC shall close (or advise BP55 Operator to close) the 55L3A and 55L1D breakers

- BP55 Operator shall advise Customers of readiness to restore 55F1 and 55F2 feeders to service

- SCC shall close (or advise BP55 Operator to close) the 55YF1and 55YF2 breakers

- SCC shall close (or advise BP55 Operator to close) 55T1SC1 breaker if the voltage is below 32.8kV

3.11. To restore 55T1 Bank to service after automatic outage

If 55T1Bank trips auto due to fault:

BP55 Operator shall:

- Advise SCC about the outage

- Acknowledge all alarms and record relay operation details

- Reset relay targets

- Report relay operation details to SCC

SCC shall energize (or advise the BP55 Operator to energize) the bank **ONCE** by closing 55L3A and 55L1D breakers

BP55 Operator shall advise Customer of readiness to restore 55F1and 55F2 feeders to service

SCC shall close (or advise BP55 Operator to close) 55YF1 and 55YF2 breakers

BP55 Operator shall:

- Advise the Supervisor/Area Manager of item above

- Isolate the Transformer for maintenance men to work on the equipment if the operation above is not successful. See explanation.

3.12. To Isolate 55YF1 Breaker for work

- BP55 Operator shall request for Station Guarantee from Customer on

55F1 feeder

SCC shall advise BP55 Operator to carry out the following:

- Inform customers about readiness to take off 55F1 feeder
- Request customers on 55F1 feeder to take off their load

SCC shall carry out (or advise BP55 Operator to carry out) the following:

- Open 55YF1 breaker

SCC shall advise BP55 Operator to carry out the following:

- Open 55YF1-F1 disconnect switch
- Open 55YF1-Y disconnect switch

3.13. To restore 55YF1 Breaker to service after work

3.13.1. Prepare 55YF1 breaker for restoration:

BP55 Operator shall:

- Advise SCC when work on the 55YF1 breaker has been completed and permit(s) surrendered (including all Station Guarantees)
- Check for no potential on 55YF1 Breaker and temporary grounds removed
- Close 55YF1-Y disconnect switch
- Close 55YF1-F1 disconnect switch
- Advise SCC of readiness to restore 55YF1 breaker to service

3.13.2. Restoration of 55YF1 breaker to service:

- BP55 Operator shall advise Customer of readiness to restore 55F1 feeder to service
- SCC shall close (or advise BP55 Operator to close) the 55YF1 breaker
- SCC shall close (or advise BP55 Operator to close) 55YSC1 breaker if the voltage is below 32.8kV

3.14. To Isolate 55YF2 Breaker for work

- BP55 Operator shall request for Station Guarantee from Customer on

55F2 feeder

SCC shall advise BP55 Operator to carry out the following:

- Inform Customer about readiness to take off 55F2 feeder
- Request Customer on 55F2 feeder to take off their load

SCC shall carry out (or advise BP55 Operator to carry out) the following:

- Open 55YF2 breaker

SCC shall advise BP55 Operator to carry out the following:

- Open 55YF2-F2 disconnect switch
- Open 55YF2-Y disconnect switch

3.15. To restore 55YF2 Breaker to service after work

3.15.1. Prepare 55YF2 Breaker for restoration:

BP55 Operator shall:

- Advise SCC when work on the 55YF2 breaker has been completed and permit(s) surrendered (including all Station Guarantees)
- Check for no potential on 55YF2 Breaker and temporary grounds removed
- Close 55YF2-Y disconnect switch
- Close 55YF2-F2 disconnect switch
- Advise SCC of readiness to restore 55YF2 breaker to service

3.15.2. Restoration of 55YF2 breaker to service:

- BP55 Operator shall advise Customer of readiness to restore 55F2 feeder to service
- SCC shall close (or advise BP55 Operator to close) the 55YF2 breaker
- SCC shall close (or advise BP55 Operator to close) 55YSC1 breaker if the voltage is below 32.8kV

3.16. To isolate 55SC1 Capacitor Bank for work

SCC shall carry out (or advise BP55 Operator to carry out) the following:

- Open 55YSC1 breaker

SCC shall advise BP55 Operator to carry out the following:

- Open 55YSC1-Y disconnect switch
- Close 55YSC1-G ground disconnect switch

3.17. To restore 55SC1 Capacitor Bank to service after work

3.17.1. Prepare 55SC1 Capacitor Bank for restoration:

BP55 Operator shall:

- Advise SCC when work on the 55SC1 Capacitor Bank has been completed and permit(s) surrendered (including all Station Guarantees)
- Check for no potential on 55SC1 Capacitor Bank and temporary grounds removed
- Check opened 55YSC1 breaker
- Open 55YSC1-G ground disconnect switch
- Close 55SC1-Y disconnect switch
- Advise SCC of readiness to restore 55SC1 Capacitor Bank to service

3.17.2. Restoration of 55SC1 Capacitor Bank to service:

- SCC shall close (or advise BP55 Operator to close) 55YSC1 breaker if the voltage is below 32.8kV

4. Explanation

Transformer and Bus automatic outages may be caused by the following relay operations:

- Transformer differential lockout relay-86T
- Transformer Bucholtz relay or high temperature lockout relay-86G
- Transformer overcurrent back up relays

a. If 86T operates, the breakers which have opened auto, cannot be reclosed until the lockout relay has been reset or the lockout feature has been by-passed.

- Carry out thorough inspection of the Transformer and the 34kV and 11kV
  Structures looking for oil leakage, shattered insulators on the structures and dead birds or reptiles

b. 86T can be reset manually immediately after an automatic outage if the station is attended.

c. 86G cannot be reset unless transformer gas and / or temperature conditions are normal or the MCB to the transformer protective relays is off.

NOTE:

I. If it has been necessary to restore the MCB to the transformer relay in order to reset 86G and restore a healthy bank to service, they shall not be restored until the gas and /or temperature conditions on the faulted bank is rectified.

II. Operation of 86T or 86G lockout relays may be due to major transformer faults hence No attempt should be made to re-energize the bank until Electrical Maintenance staff have inspected and meggered the Transformer.

ISOLATION AND DE-ENERGIZING

1. Open the necessary breaker(s) to take the line off potential.

2. Check all three phases off potential using the Multifunction meter or Analog Voltmeter or for Pole discrepancies on the panel.

3. Open the necessary disconnect switches or MODS to isolate the line from all sources of supply.

4. Close the Grounding Switch.

5. Report completion of the isolation and de-energizing at all assisting stations, to the where the Protection Guarantee is to be issued and to System Control Centre.

6. Issue Work or Work and Test Permit to the workman.

ORDER TO OPERATE

1. An O.TO. (Order-To-Operate) to isolate a line is as follows:

   a. Line Voltage - Check all three phases off potential
   b. Line Breaker - Check Open
   c. Line Disconnect Switches - Open, lock and Tag (MCB to MOD Turn-off)

2. Due to communication difficulties arising when grounds are placed on a line it is necessary to issue a Protection Guarantee on the line before grounds are placed. A work and Test Permit allows for closing and opening permanent grounds switches while the Permit is in effect.

3. If work is to be done a permanent ground switches a PC 14 to close the ground switch is not required.

   The station is a two 161kV buses, the A and D bus arrangements in ring main configuration that provides the normal points of supply to all circuits such as the KP3BP and KP1AD lines, 55T1 transformer and 55SC1 Capacitor Bank.

5. Approval

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Director, TSD