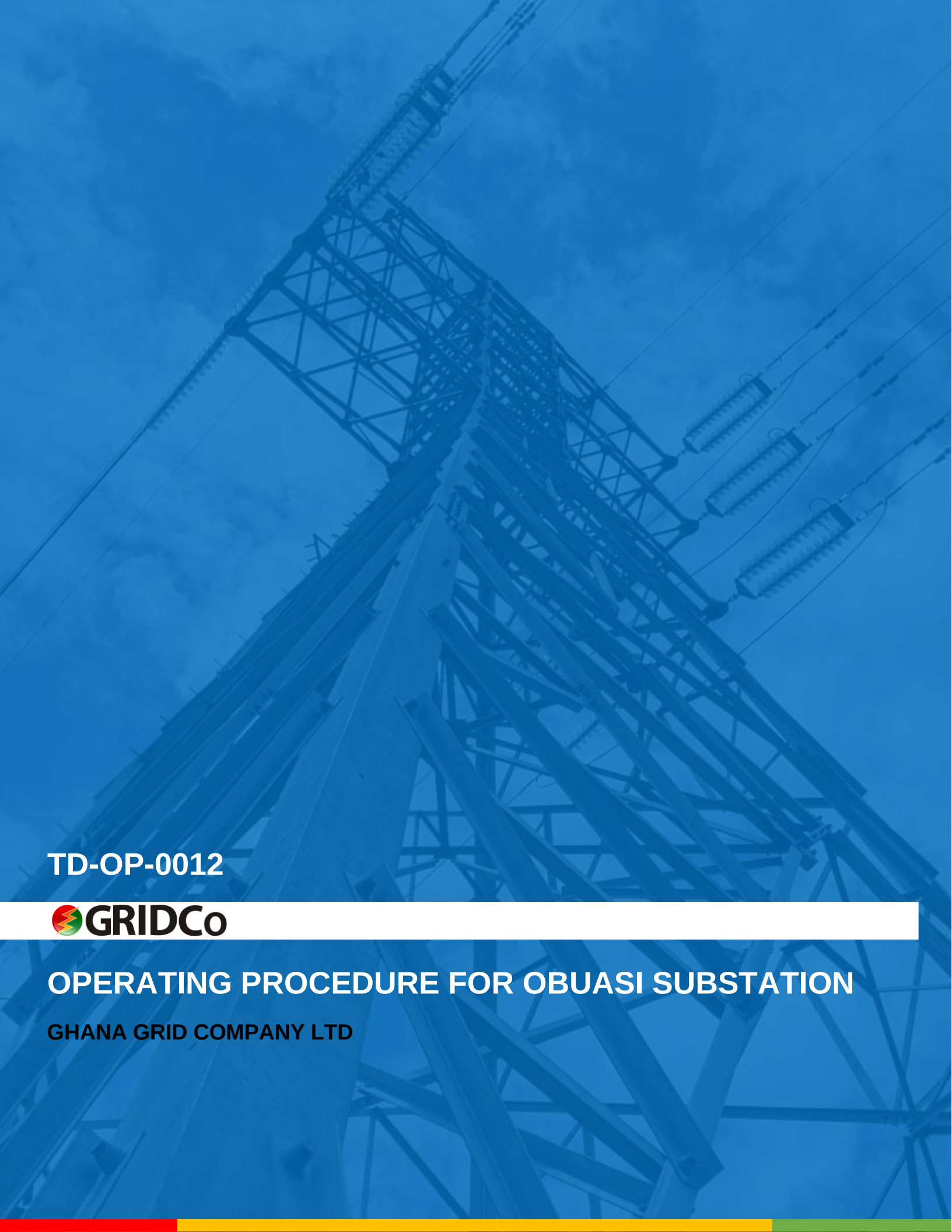

TD-OP-0012

GRIDCo

OPERATING PROCEDURE FOR OBUASI SUBSTATION

GHANA GRID COMPANY LTD

TECHNICAL DIRECTIVES

Title:	**OPERATING PROCEDURE FOR OBUASI SUBSTATION (B12)**		
Issued To:	Director, System Operations Director, SNS Manager, SCC Manager, Dispatch Operations Area Manager, Kumasi Operating Staff, Kumasi Area Maintenance Staff, Kumasi Area Dispatch Staff, SCC	**Number:**	TD-OP-0012
		Subject Area:	Operating
		Issue Date:	Trial
		Origin:	Technical Services
Key Words:	Take Out, Isolate, Prepare, Energize, Restore, Automatic Outage		

CONTENTS

TECHNICAL DIRECTIVES

1. Purpose

This directive specifies the operations to be carried out to take out of service, isolate or restore equipment at B12 Substation to service for planned and auto outages.

2. Scope

The directive will be used by Operators at Kumasi Operating Area and System Control Center (SCC) for operation of equipment at B12 Substation.

3. Procedure

3.1. To take B2KY line out of service

SCC shall carry out (or advise the B12 Operator to carry out) the following:

- Open 12B2KY breaker

SCC shall carry out (or advise the KY43 Operator to carry out) the following:

- Open 43L2A breaker
- Check for no potential on B2KY line

3.2. To take out, isolate and de-energize B2KY line for work

- B12 Operator shall request for Station Guarantee from KY43

SCC shall carry out (or advise the B12 Operator to carry out) the following:

- Verify opened 12B2KY-S bypass disconnect switch and turn off its 125Vdc supply
- Open 12B2KY breaker

SCC shall carry out (or advise the KY43 Operator to carry out) the following:

- Verify opened 43L2-D transfer disconnect switch and turn off its 125Vdc supply
- Open 43L2A breaker
- Check for no potential on B2KY line

SCC shall advise the B12 Operator to carry out the following:

- Check opened 12B2KY-S disconnect switch and turn off 125Vdc supply
- Open 12B2KY-L2 disconnect switch and turn off 125Vdc supply

- Close 12B2KY -G ground disconnect switch

SCC shall advise the KY43 Operator to carry out the following:

- Open 43L2A-L2 disconnect switch and turn off 125Vdc supply
- Close 43B2KY-G ground disconnect switch

3.3. To restore B2KY line to service after work

3.3.1. Prepare B2KY line for restoration

B12 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 B2KY line

SCC shall advise KY43 Operator to carry out the following:

- Check opened 43L2A breaker
- Check opened 43L2-D transfer disconnect switch and turn on 125Vdc supply
- Open 43B2KY-G ground disconnect switch
- Turn on 125Vdc supply and close 43L2A-L2 disconnect switch

SCC shall advise B12 Operator to carry out the following:

- Check opened 12B2KY breaker
- Check opened 12B2KY-S bypass disconnect switch and turn on 125Vdc supply
- Open 12B2KY-G ground disconnect switch
- Turn on 125Vdc supply and close 12B2KY-L2 disconnect switch

3.3.2. Restoration of B2KY line to service:

SCC shall:

- Advise the B12 and KY43 Operators of readiness to restore B2KY line to service
- Close (or advise KY43 operator to close) 43L2A breaker

- Close (or advise B12 operator to close) 12B2KY breaker

3.4. To restore B2KY line to service after automatic outage

If B2KY line trips auto due to fault on the line:

- 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 B12 Operator to energize) the line **ONCE** by closing 12B2KY breaker
- Close (or advise the KY43 Operator to close) 43L2A breaker
- Advise the Supervisor/Area Manager of operation above
- Advise maintenance men to patrol the line if the above operation is not successful

3.5. To take B3NB line out of service

SCC shall carry out (or advise the B12 Operator to carry out) the following:

- Verify opened 12B3NB-S bypass disconnect switch and turn off its 125Vdc supply
- Open 12B3NB breaker

SCC shall carry out (or advise the NB21 Operator to carry out) the following:

- Open 21L5L3 and 21L1L3 breakers
- Check for no potential on B3NB line

3.6. To take out, isolate and de-energize B3NB line for work

- B12 Operator shall request for Station Guarantee from NB21

SCC shall carry out (or advise the B12 Operator to carry out) the following:

- Open 12B3NB breaker

SCC shall carry out (or advise the NB21 Operator to carry out) the following:

- Open 21L5L3 and 21L1L3 breakers

- Check for no potential on B3NB line

SCC shall carry out (or advise the B12 Operator to carry out) the following:

- Check opened 12B3NB-S disconnect switch and turn off 125Vdc supply

- Open 12B3NB-L3 disconnect switch and turn off 125Vdc supply

- Close 12B3NB-G ground disconnect switch

SCC shall carry out (or advise the NB21 Operator to carry out) the following:

- Open 21L5L3-L3 and 21L1L3-L3 disconnect switches and turn off its 125Vdc supply

- Close 21B3NB-G ground disconnect switch

3.7. To restore B3NB line to service after work

3.7.1. Prepare B3NB line for restoration:

B12 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 B3NB line

SCC shall advise NB21 Operator to carry out the following:

- Check opened 21L5L3 and 21L1L3 breakers

- Open 21B3NB-G ground disconnect switch

- Turn on 125Vdc supply and close 21L5L3-L3 and 21L1L3-L3 disconnect switches

SCC shall carry out (or advise the B12 Operator to carry out) the following:

- Check opened 12B3NB-S bypass disconnect switches

- Check opened 12B3NB breaker

- Open 12B3NB-G ground disconnect switch

- Turn on 125Vdc supply and close 12B3NB-L3 disconnect switch

3.7.2. Restoration of B3NB line to service:

SCC shall:

- Advise the B12 and NB21 Operators of readiness to restore B3NB line to service

- Close (or advise NB21 Operator to close) 21L5L3 and 21L1L3 breakers

- Close (or advise B12 operator to close) 12B3NB breaker

3.8. To restore B3NB line to service after automatic outage

If B3NB line trips auto due to fault on the line:

B12 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 B12 Operator to energize) the line **ONCE** by closing 12B3NB breaker

- Close (or advise the NB21 Operator to close) 21L5L3 and 21L1L3 breakers

- Advise the Supervisor/Area Manager of operation above

- Advise maintenance men to patrol the line if the above operation is not successful

3.9. To take P6B line out of service

SCC shall carry out (or advise the B12 Operator to carry out) the following:

- Verify opened 12P6B-S bypass disconnect switch and turn off its 125Vdc supply

- Open 12P6B breaker

SCC shall carry out (or advise the P10 Operator to carry out) the following:

- Open 10L2L6 and 10DL6 breakers
- Check for no potential on P6B line

3.10. To take out, isolate and de-energize P6B line for work

- B12 Operator shall request for Station Guarantee from P10

SCC shall carry out (or advise the B12 Operator to carry out) the following:

- Open 12P6B breaker

SCC shall carry out (or advise the P10 Operator to carry out) the following:

- Open 10L2L6 and 10DL6 breakers
- Check for no potential on P6B line

SCC shall carry out (or advise the B12 Operator to carry out) the following:

- Verify opened 12P6B-S disconnect switch and turn off 125Vdc supply
- Open 12P6B-L6 disconnect switch and turn off 125Vdc supply
- Close 12P6B-G ground disconnect switch

SCC shall carry out (or advise the P10 Operator to carry out) the following:

- Open 10L2L6-L6 and 10DL6-L6 disconnect switches and turn off 125Vdc supply
- Close 10P6B-G ground disconnect switch

3.11. To restore P6B line to service after work

3.11.1. Prepare P6B line for restoration:

B12 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 P6B line

SCC shall advise P10 Operator to carry out the following:

- Check opened 10L2L6 and 10DL6 breakers
- Open 10P6B-G ground disconnect switch
- Turn on 125Vdc supply and close 10L2L6-L6 and 10DL6-L6 disconnect switches

SCC shall carry out (or advise the B12 Operator to carry out) the following:

- Check opened 12P6B-S bypass disconnect switches
- Check opened 12P6B breaker
- Open 12P6B-G ground disconnect switch
- Turn on 125Vdc supply and close 12P6B-L6 disconnect switch

3.11.2. Restoration of P6B line to service:

SCC shall:

- Advise the B12 and P10 Operators of readiness to restore P6B line to service
- Close (or advise P10 Operator to close) 10L2L6 and 10DL6 breakers
- Close (or advise B12 operator to close) 12P6B breaker

3.12. To restore P6B line to service after automatic outage

If P6B line trips auto due to fault on the line:

B12 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 B12 Operator to energize) the line **ONCE** by closing 12P6B breaker
- Close (or advise the P10 Operator to close) 10L2L6 and 10DL6 breakers

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

3.13. To isolate 12T1 Bank for work

SCC shall carry out or advise B12 operator to carry out the following:

- Inform customers about readiness to take off 12T1 Bank
- Request customers on 12T1 Bank to take off their load
- Transfer Station Service from AC1 to AC2, if Station Service is on 12T1
- Open AC1 Contactor/MCB to take off supply to 12T1 transformer auxiliaries

SCC shall carry out (or advise B12 Operator to carry out) the following:

- Open 12T1F5 breaker
- Open 12A2T1 breaker
- Check for no potential on 12T1 Bank
- Open 12A2T1-A2 disconnect switch and turn off its 125Vdc supply
- Open 12T1F5-T1 disconnect switch
- Check open 12F4-F5 disconnect switch
- Check open 12T1-Z1 disconnect switch

3.14. To restore 12T1 Bank to service

3.14.1. Prepare 12T1 Bank for service after work

- Advise SCC when work on the transformer has been completed and permit(s) surrendered (including all Station Guarantees)
- Check for no potential on 12T1 Bank and temporary grounds removed
- Turn on 125Vdc supply and close 12A2T1-A2 disconnect switch
- Close 12T1F5-T1 disconnect switch

- Check open 12F4-F5 disconnect switch
- Check open 12T1-Z1 disconnect switch

3.14.2. Restoration of 12T1 Bank to service:

- SCC shall close (or advise B12 Operator to close) 12A2T1 breaker
- Advise customers of readiness to restore 12F5 feeder to service

  SCC shall close (or advise B12 Operator to close) 12T1F5 breaker

-

3.15. To restore 12T1 Bank to service after automatic outage

If 12T1 Bank trips auto due to fault on the equipment

W6 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 B12 Operator to energize) the Transformer **ONCE** by closing 12A2T1 breaker
- Advise Customer of readiness to restore 12T1 Bank to service
- Close 12T1F5 breaker

B12 Operator shall:

- Advise the Supervisor/Area Manager and SCC of operation above
- Isolate the Transformer for maintenance men to work on the equipment if operation above is not successful. See explanation.

3.16. To isolate 12T2 Bank for work

SCC shall advise B12 operator to carry out the following:

- Inform customers about readiness to take off 12T2 bank

- Open AC2 Contactor/MCB to take off supply to 12T2 transformer auxiliaries

SCC shall carry out (or advise B12 Operator to carry out) the following:

- Open 12Z1F3 breaker
- Open 12Z3F6 breaker
- Open 12A1T2 breaker
- Check for no potential on 12T2 Bank
- Open 12T2-Z2 disconnect switch
- Open 12A1T2-A1 disconnect switch and turn off its 125Vdc supply
- Check open 12Z3F6-S and 12Z1F3-S by-pass disconnect switches
- Check open 12T1-Z1 and 12T3-Z3 disconnect switches

3.17. To restore of 12T2 Bank to service

3.17.1. Prepare 12T2 Bank to service after work

B12 Operator shall:

- Advise SCC when work on the transformer has been completed and permit(s) surrendered (including all Station Guarantees)
- Check for no potential on 12T2 Bank and temporary grounds removed
- Check open 12Z3F6-S and 12Z1F3-S by-pass disconnect switches
- Check open 12T1-Z1 and 12T3-Z3 disconnect switches
- Close 12T2-Z2 disconnect switch
- Turn on its 125Vdc supply and close 12A1T2-A1 disconnect switch
- Advise SCC of readiness to restore 12T2 Bank to service

3.17.2. Restoration of 12T2 Bank to service:

- SCC shall close (or advise B12 Operator to close) 12A1T2 breaker
- B12 Operator shall advise Customers of readiness to restore 12F3 and 12F6 feeders to service

- SCC shall close (or advise B12 Operator to close) 12Z1F3 and 12Z3F6 breakers

3.18. To restore 12T2 Bank to service after automatic outage

If 12T2 Bank trips auto due to fault:

B12 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 B12 Operator to energize) the Transformer **ONCE** by closing 12A1T2 breaker
- Advise Customer of readiness to restore 12F3 and 12F6 feeders to service
- Close 12Z1F3 breaker
- Close 12Z3F6 breaker

B12 Operator shall:

- Advise the Supervisor/Area Manager and SCC of operation above
- Isolate the Transformer for maintenance men to work on the equipment if operation above is not successful. See explanation.

3.19. To isolate 12T3 Bank for work

SCC shall advise B12 operator to carry out the following:

- Inform customers about readiness to take off 12T3 bank
- Request customers on 12T3 Bank to take off their load
- Transfer Station Service from AC2 to AC1, if Station Service is on 12T3
- Open AC2 Contactor/MCB to take off supply to 12T3 transformer auxiliaries

SCC shall carry out (or advise B12 Operator to carry out) the following:

- Open 12T3F4 breaker
- Check open 12T3-Z3 disconnect switch
- Check open 12F4-F5 disconnect switch
- Check open 12T3F4-S by-pass disconnect switch
- Open 12A1T3-A1 disconnect switch and turn off its 125Vdc supply
- Check for no potential on 12T3 Bank

3.20. To restore of 12T3 Bank to service

3.20.1. Prepare 12T3 Bank to service after work

B12 Operator shall:

- Advise SCC when work on the transformer has been completed and permit(s) surrendered (including all Station Guarantees)
- Check for no potential on 12T3 Bank and temporary grounds removed
- Check open 12T3F4 breaker
- Check open 12T3-Z3 disconnect switch
- Check open 12F4-F5 disconnect switch
- Check open 12T3F4-S by-pass disconnect switch
- Advise SCC of readiness to restore 12T3 Bank to service

3.20.2. Restoration of 12T3 Bank to service:

- SCC shall advise B12 Operator to turn on 125vdc supply and Close 12A1T3-A1 disconnect switch
- B12 Operator shall advise Customers of readiness to restore 12F4 feeder to service
- SCC shall close (or advise B12 Operator to close) 12T3F4 breaker

3.21. To restore 12T3 Bank to service after automatic outage

If 12T3 Bank trips auto due to fault:

B12 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 B12 Operator to energize) the Transformer **ONCE** by closing 12B2KY and 12A1A2 breakers
- Advise Customer of readiness to restore 12F4 Bank to service
- Close 12T3F4 breaker

B12 Operator shall:

- Advise the Supervisor/Area Manager and SCC of operation above
- Isolate the Transformer for maintenance men to work on the equipment if operation above is not successful. See explanation.

3.22. To isolate 12Z3F1 Breaker for work

SCC shall carry out (or advise B12 Operator to carry out) the following:

- Open 12Z3F1 breaker
- Open 12Z3F6 breaker
- Open 12Z2F1 breaker
- Check open 12T3-Z3,12Z3F1-S, 12Z2F1-S and 12Z3F6-S disconnect switches
- Open 12Z3F1-Z3 disconnect switch
- Open 12Z3F1-F1 disconnect switch
- Check for no potential on 12T3 Bank

3.23. To restore 12Z3F1 breaker after work

3.23.1. Prepare 12Z3F1 Breaker for service after work

B12 Operator shall:

- Advise SCC when work on the feeder breaker has been completed and permit(s) surrendered (including all Station Guarantees)
- Check for no potential on 12Z3F1 Breaker and temporary grounds removed
- Check open 12Z3F1 breaker
- Check open 12Z3F6 breaker
- Check open 12Z2F1 breaker
- Check open 12T3-Z3, 12Z3F1-S, 12Z2F1-S and 12Z3F6-S disconnect switches
- Close 12Z3F1-Z3 disconnect switch
- Close 12Z3F1-F1 disconnect switch

3.23.2. Restoration of 12Z3F1 breaker to service:

- B12 Operator shall advise Customers of readiness to restore 12F6 feeder to service
- SCC shall close (or advise B12 Operator to close) the 12Z3F1, 12Z3F6, 12Z2F1 breakers

3.24. To isolate 12Z2F1 Breaker for work

SCC shall carry out or advise the B12 Operator to carry out the following:

- Inform customer about readiness to take off 12T2 Bank
- Request customer on 12T2 Bank to take off their load

SCC shall carry out (or advise B12 Operator to carry out) the following:

- Open 12Z3F1 breaker
- Open 12Z2F1 breaker
- Open 12Z1F3 breaker

- Open 12Z1F2 breaker
- Open 12Z3F6 breaker
- Open 12A1T2 breaker
- Check open 12T2-Z2, 12T3-Z3, 12Z2F2-S,12Z3F1-S,12Z1F2-S and 12Z2F1-S disconnect switches
- Open 12A1T2-A1 disconnect switch and turn-off 125vdc supply
- Open 12Z2F1-Z2 disconnect switch
- Open 12Z2F1-F1 disconnect switch
- Check for no potential on 12T2 Bank

3.25. To restore 12Z2F1 breaker after work

3.25.1. Prepare 12Z2F1 Breaker for service after work

B12 Operator shall:

- Advise SCC when work on the feeder breaker has been completed and permit(s) surrendered (including all Station Guarantees)
- Check for no potential on 12Z2F1 Breaker and temporary grounds removed
- Check open 12Z3F1 breaker
- Check open 12Z2F1 breaker
- Check open 12Z2F2 breaker
- Check open 12Z1F3 breaker
- Check open 12Z1F2 breaker
- Check open 12Z3F6 breaker
- Check open 12T2-Z2, 12T3-Z3, 12Z3F6-S,12Z3F1-S, 12Z1F2-S and 12Z2F1-S disconnect switches
- Close 12Z2F1-Z2 disconnect switch
- Close 12Z2F1-F1 disconnect switch
- Turn on 125Vdc supply and close 12A1T2-A1 disconnect switch

3.25.2. Restoration of 12Z2F1 breaker to service:

- SCC shall close (or advise B12 Operator to close) the 12A1T2 breaker
- B12 Operator shall advise Customers of readiness to restore 12F3 and 12F6 feeders to service
- SCC shall close (or advise B12 Operator to close) the 12Z2F1, 12Z2F2, 12Z3F1, 12Z3F6, 12Z1F2 and 12Z1F3 breakers

3.26. To isolate 12Z2F2 Breaker for work

SCC shall carry out or advise the B12 Operator to carry out the following:

- Inform customers about readiness to take off 12T2 Bank
- Request customers on 12T2 Bank to take off their load

SCC shall carry out (or advise B12 Operator to carry out) the following:

- Open 12Z2F2 breaker
- Open 12Z3F1 breaker
- Open 12Z1F2 breaker
- Open 12Z1F3 breaker
- Open 12Z2F1 breaker
- Open 12Z3F6 breaker
- Open 12A1T2 breaker
- Check open 12T2-Z2, 12T3-Z3, 12Z2F2-S,12Z1F2-S, 12Z2F1-S,12Z1F3-S,12Z3F1-S and 12Z3F6-S disconnect switches
- Open 12Z2F1-Z2 disconnect switch
- Open 12Z2F1-F1 disconnect switch
- Check for no potential on 12T2 Bank

3.27. To restore 12Z2F2 breaker after work

3.27.1. Prepare 12Z2F2 Breaker for service after work

B12 Operator shall:

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

- Check for no potential on 12Z2F2 Breaker and temporary grounds removed

- Check open 12Z2F2 breaker

- Check open 12Z1F2 breaker

- Check open 12Z2F1 breaker

- Check open 12Z1F3 breaker

- Check open 12Z3F1 breaker

- Check open 12Z3F6 breaker

- Check open 12T2-Z2, 12T3-Z3, 12Z2F2-S,12Z1F2-S, 12Z2F1-S,12Z1F3-S,12Z3F1-S and 12Z3F6-S disconnect switches

- Close 12Z2F2-Z2 disconnect switch

- Close 12Z2F2-F2 disconnect switch

3.27.2. Restoration of 12Z2F2 breaker to service:

- SCC shall close (or advise B12 Operator to close) the 12A1T2 breaker

- B12 Operator shall advise Customers of readiness to restore 12F3 and 12F6 feeders to service

- SCC shall close (or advise B12 Operator to close) the 12Z2F2, 12Z1F2, 12Z2F1, 12Z1F3, 12Z3F6, 12Z3F1 breakers

3.28. To isolate 12Z1F2 Breaker for work

SCC shall carry out or advise the B12 Operator to carry out the following:

- Inform customers about readiness to take off 12T2 Bank

- Request customers on 12T2 Bank to take off their load

SCC shall carry out (or advise B12 Operator to carry out) the following:

- Open 12Z1F2 breaker

- Open 12Z1F3 breaker

- Open 12Z2F2 breaker
- Open 12Z2F1 breaker
- Open 12Z3F1 breaker
- Open 12Z3F6 breaker
- Check open 12T1-Z1, 12T2-Z1,12T3-Z3, 12Z3F6-S, 12Z1F2-S, 12Z1F3-S, 12Z2F2-S,12Z2F1 and 12Z1F3-S disconnect switches
- Open 12Z1F2-Z1 disconnect switch
- Open 12Z1F2-F2 disconnect switch
- Check for no potential on 12T1 Bank

3.29. To restore 12Z1F2 breaker after work

3.29.1. Prepare 12Z1F2 Breaker for service after work

B12 Operator shall:

- Advise SCC when work on the feeder breaker has been completed and permit(s) surrendered (including all Station Guarantees)
- Check for no potential on 12Z1F2 Breaker and temporary grounds removed
- Check open 12Z1F2 breaker
- Check open 12Z1F3 breaker
- Check open 12Z2F2 breaker
- Check open 12Z2F1 breaker
- Check open 12Z3F1 breaker
- Check open 12Z3F6 breaker
- Check open 12T1-Z1, 12T2-Z2, 12T3-Z3,12Z2F2-S, 12Z1F2-S, 12Z1F3-S, 12Z2F1-S, 12Z3F1-S and 12Z3F6-S disconnect switches
- Close 12Z1F2-Z1 disconnect switch
- Close 12Z1F2-F2 disconnect switch

3.29.2. Restoration of 12Z1F2 breaker to service:

- SCC shall close (or advise B12 Operator to close) the 12A2T1 breaker

- B12 Operator shall advise Customers of readiness to restore 12F3 and 12F6 feeders to service

- SCC shall close (or advise B12 Operator to close) the 12Z1F2, 12Z1F3, 12Z2F2, 12Z3F1, 12Z3F6 and 12Z2F1 breakers

3.30. To isolate 12Z1F3 Breaker for work

- B12 Operator shall request Station Guarantee from customer on 12F3 Feeder

SCC shall carry out or advise the B12 Operator to carry out the following:

- Inform customers about readiness to take off 12T2 Bank

- Request customers on 12T2 Bank to take off their load

SCC shall carry out (or advise B12 Operator to carry out) the following:

- Open 12Z1F3 breaker

- Open 12Z1F2 breaker

- Open 12Z3F1 breaker

- Open 12Z2F2 breaker

- Open 12Z2F1 breaker

- Open 12Z3F6 breaker

- Check open 12T1-Z1, 12T2-Z2, 12T3-Z3, 12Z1F3-S,12Z1F2-S, 12Z2F1-S, 12Z2F2-S,12Z3F1-S and 12Z3F6-S disconnect switches

- Open 12Z1F2-Z2 disconnect switch

- Open 12Z1F2-F2 disconnect switch

- Check for no potential on 12T1 Bank

3.31. To restore 12Z1F3 breaker after work

3.31.1. Prepare 12Z1F3 Breaker for service after work

B12 Operator shall:

- Advise SCC when work on the feeder breaker has been completed and

permit(s) surrendered (including all Station Guarantees)

- Check for no potential on 12Z1F2 Breaker and temporary grounds removed
- Check open 12Z1F3 breaker
- Check open 12Z1F2 breaker
- Check open 12Z2F2 breaker
- Check open 12Z2F1 breaker
- Check open 12Z3F1 breaker
- Check open 12Z3F6 breaker
- Check open 12T1-Z1, 12T2-Z2, 12T3-Z3, 12Z1F3-S,12Z1F2-S, 12Z2F1-S, 12Z2F2-S,12Z3F1-S and 12Z3F6-S disconnect switches
- Close 12Z1F2-Z2 disconnect switch
- Close 12Z1F2-F2 disconnect switch

3.31.2. Restoration of 12Z1F3 breaker to service:

- SCC shall close (or advise B12 Operator to close) the 12A2T1 breaker
- B12 Operator shall advise Customers of readiness to restore 12F3 and 12F6 feeders to service
- SCC shall close (or advise B12 Operator to close) the 12Z1F2, 12Z1F3, 12Z2F1,12Z3F1,12Z3F6 and 12Z2F2 breakers

3.32. To isolate 12Z3F6 Breaker for work

B12 Operator shall request Station Guarantee from customer on 12F6 Feeder

SCC shall carry out or advise the B12 Operator to carry out the following:

- Inform customers about readiness to take off 12T2 Bank
- Request customers on 12T2 Bank to take off their load

SCC shall carry out (or advise B12 Operator to carry out) the following:

- Open 12Z3F6 breaker
- Open 12Z3F1 breaker

- Open 12Z2F2 breaker
- Open 12Z2F1 breaker
- Open 12Z3F1 breaker
- Open 12Z1F2 breaker
- Check open 12T1-Z1, 12T2-Z2, 12T3-Z3, 12Z1F3-S,12Z1F2-S, 12Z2F1-S, 12Z2F2-S,12Z3F1-S and 12Z3F6-S disconnect switches
- Open 12Z3F6-Z3 disconnect switch
- Open 12Z3F6-F6 disconnect switch
- Check for no potential on 12T2 Bank

3.33. To restore 12Z3F6 breaker after work

3.33.1. Prepare 12Z3F6 Breaker for service after work

B12 Operator shall:

- Advise SCC when work on the feeder breaker has been completed and permit(s) surrendered (including all Station Guarantees)
- Check for no potential on 12Z3F6 Breaker and temporary grounds removed
- Check open 12Z3F6 breaker
- Check open 12Z3F1 breaker
- Check open 12Z2F2 breaker
- Check open 12Z2F1 breaker
- Check open 12Z1F2 breaker
- Check open 12Z1F3 breaker
- Check open 12T1-Z1, 12T2-Z2, 12T3-Z3, 12Z1F3-S,12Z1F2-S, 12Z2F1-S, 12Z2F2-S,12Z3F1-S and 12Z3F6-S disconnect switches
- Close 12Z3F6-Z3 disconnect switch
- Close 12Z3F6-F6 disconnect switch

3.33.2. Restoration of 12Z3F6 breaker to service:

- B12 Operator shall advise Customers of readiness to restore 12F3 and 12F6 feeders to service

- SCC shall close (or advise B12 Operator to close) the 12Z3F6, 12Z3F1, 12Z2F1, 12Z2F2, 12Z1F2 and 12Z1F3 breakers

3.34. To isolate 12T3F4 Breaker for work

B12 Operator shall request Station Guarantee from customer on 12F4 Feeder

SCC shall carry out or advise the B12 Operator to carry out the following:

- Inform customer about readiness to take off 12T3 Bank

- Request customer on 12T3 Bank to take off their load

- Transfer Station Service supply from AC2 to AC1, if station service is on 12T3

SCC shall carry out (or advise B12 Operator to carry out) the following:

- Open 12T3F4 breaker

- Open 12A1T3-A1 disconnect switch and turn-off 125vdc supply

- Check open 12T3-Z3 and 12F4-F5 disconnect switches

- Open 12T3F4-T3 disconnect switch

- Open 12T3F4-F4 disconnect switch

- Check for no potential on 12T3 Bank

3.35. To restore 12T3F4 breaker after work

3.35.1. Prepare 12T3F4 Breaker for service after work

B12 Operator shall:

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

- Check for no potential on 12T3F4 Breaker and temporary grounds removed

- Check open 12T3F4 breaker
- Check open 12T3-Z3 and 12F4-F5 disconnect switches
- Close 12T3F4-T3 disconnect switch
- Close 12T3F4-F4 disconnect switch
- Turn on 125Vdc supply and close 12A1T3-A1 disconnect switch

3.35.2. Restoration of 12T3F4 breaker to service:

- B12 Operator shall advise Customers of readiness to restore 12F4 feeder to service
- SCC shall close (or advise B12 Operator to close) the 12T3F4 breaker

3.36. To isolate 12T1F5 Breaker for work

- B12 Operator shall request Station Guarantee from customer on 12F3 Feeder

SCC shall carry out or advise the B12 Operator to carry out the following:

- Inform customers about readiness to take off 12T1 Bank
- Request customers on 12T1 Bank to take off their load
- Transfer Station Service from AC1 to AC2, if Station Service is on 12T1

SCC shall carry out (or advise B12 Operator to carry out) the following:

- Open 12T1F5 breaker
- Open 12A2T1 breaker
- Check open 12T1-Z1, 12F4-F5 and 12T1F5-S disconnect switches
- Open 12T1F5-T1 disconnect switch
- Open 12T1F5-F5 disconnect switch
- Check for no potential on 12T1 Bank

3.37. To restore 12T1F5 breaker after work

3.37.1. Prepare 12T1F5 Breaker for service after work

B12 Operator shall:

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

- Check for no potential on 12T1F5 Breaker and temporary grounds removed

- Check open 12T1F5 breaker

- Check open 12T1-Z1, 12F4-F5 and 12T1F5-S disconnect switches

- Close 12T1F5-T1 disconnect switch

- Close 12T1F5-F5 disconnect switch

3.37.2. Restoration of 12T1F5 breaker to service:

- SCC shall close (or advise B12 Operator to close) the 12A2T1 breaker

- B12 Operator shall advise Customers of readiness to restore 12F5 feeder to service

- SCC shall close (or advise B12 Operator to close) the 12T1F5 breaker

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 21 to close the ground switch is not required.

    The station is only two 161Kv bus arrangements. The main 'A1' and 'A2' bus provides the normal points of supply to all circuits/equipment such as B2KY, B3NB, P6B, lines, 12T1, 12T2 and 12T3 transformers. This station supply 6.6kV and 11Kv to AGC and ECG respectively, 12TSS1 and 12TSS2 are on the 11kV side of 12T1 and 12T3 respectively whilst 12GT1 and 12GT2 are on the 6.6kV side of the

12T1 and 12T2 Transformers respectively.

5. Approval

……

Director, Technical Services