

TD-OP-0029



OPERATING PROCEDURE FOR BOLGA SUBSTATION

GHANA GRID COMPANY LTD

TECHNICAL DIRECTIVES

Title: OPERATING PROCEDURE FOR BOLGA SUBSTATION (BG29)	
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	Manager, Dispatch Operations
	Area Manager, Bolga
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TECHNICAL DIRECTIVES

Contents

1. Purpose.....	3
2. Scope.....	3
3. Procedure.....	3
3.1. To take BG1NY line out of service	3
3.2. To take out, isolate and de-energize BG1NY line for work.....	3
3.3. To restore BG1NY line to service after work	4
3.4. To restore BG1NY line to service after automatic outage.....	5
3.5. To take TM2BG line out of service	5
3.6. To take out, isolate and de-energize TM2BG line for work.....	5
3.7. To restore TM2BG line to service after work	6
3.8. To take out, isolate and de-energize TM2BG line for work (Along Powered Skywire).....	7
3.9. To restore TM2BG line to service after work (Along Powered Skywire)	8
3.10. To restore TM2BG line to service after automatic outage.....	8
3.11. To take BG3ZB line out of service	9
3.12. To take out, isolate and de-energize BG3ZB line for work.....	9
3.13. To restore BG3ZB line to service after work	10
3.14. To restore BG3ZB line to service after automatic outage.....	11
3.15. To take BG4NY line out of service	11
3.16. To take out, isolate and de-energize BG4NY line for work.....	12
3.17. To restore BG4NY line to service after work	12
3.18. To restore BG4NY line to service after automatic outage.....	13
3.19. To isolate 29T1 Transformer for work	14
3.20. To restore 29T1 Bank to service after work	15
3.21. To restore 29T1 Bank to service after automatic outage.....	15
3.22. To isolate 29T2 Transformer for work	16
3.23. To restore 29T2 Bank to service after work	17
3.24. To restore 29T2 Bank to service after automatic outage.....	18
3.25. To isolate 29R1 Reactor for work.....	18
3.26. To restore 29R1 Reactor to service after work.....	19
3.27. To Isolate 29T1F1 Breaker for work.....	19
3.28. To restore 29T1F1 Breaker to service after work	20
3.29. To Isolate 29T1F2 Breaker for work.....	20
3.30. To restore 29T1F2 Breaker to service after work	21
3.31. To Isolate 29T1F3 Breaker for work.....	22
3.32. To restore 29T1F3 Breaker to service after work	22
3.33. To Isolate 29T2Y2 Breaker for work	23
3.34. To restore 29T2Y2 Breaker to service after work.....	24
3.35. To Isolate 29T2F5 Breaker for work	24
3.36. To restore 29T2F5 Breaker to service after work	25
4. Explanation.....	26
5. Approval.....	27

TECHNICAL DIRECTIVES

1. Purpose

This directive specifies the operations to be carried out to take out of service, isolate or restore equipment at BG29 Substation to service for planned and auto outages.

2. Scope

The directive will be used by Operators at Bolga Operating Area and System Control Center (SCC) for operation of equipment at BG29 Substation.

3. Procedure

3.1. To take BG1NY line out of service

SCC shall carry out (or advise the BG29 Operator to carry out) the following:

- Verify opened 29L1-D transfer disconnect switch
- Open 29L1A breaker.

SCC shall carry out (or advise the NY82 Operator to carry out) the following:

- Open 82L1A and 82L1D breaker
- Check for no potential on BG1NY line

3.2. To take out, isolate and de-energize BG1NY line for work

- BG29 Operator shall request for Station Guarantee from NY82

SCC shall carry out (or advise the NY82 Operator to carry out) the following:

- Open 82L1A and 82L1D breakers

SCC shall carry out (or advise the BG29 Operator to carry out) the following:

- Check opened 29L1A-D transfer disconnect switch and turn off its 125Vdc supply
- Open 29L1A breaker
- Check for no potential on BG1NY line

SCC shall advise NY82 Operator to carry out the following:

- Open 82L1A-L1 and 82L1D-L1 disconnect switches and turn off its

125Vdc supply

- Close 82BG1NY-G ground disconnect switch

SCC shall advise BG29 Operator to carry out the following:

- Open 29L1A-L1 disconnect switch and turn off its 125Vdc supply
- Close 29BG1NY-G ground disconnect switch

3.3. To restore BG1NY line to service after work

3.3.1. Prepare BG1NY line for restoration:

BG29 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 BG1NY line

SCC shall advise NY82 Operator to carry out the following:

- Check opened 82L1A and 82L1D breakers
- Open 82BG1NY-G ground disconnect switch
- Turn on 125Vdc supply and close 82L1A-L1 and 82L1D-L2 disconnect switches

SCC shall advise BG29 Operator to carry out the following:

- Check opened 29L1A breaker
- Check opened 29L1-D transfer disconnect switch and turn on its 125Vdc supply
- Open 29BG1NY-G ground disconnect switch
- Turn on 125Vdc supply and close 29L1A-L1 disconnect switch

3.3.2. Restoration of BG1NY line to service:

SCC shall:

- Advise the BG29 and NY82 Operators of readiness to restore BG1NY line to service
- Close (or advise the BG29 Operator to close) 29L1A breaker

TECHNICAL DIRECTIVES

- Close (or advise the NY82 Operator to close) 82L1A and 82L1D breakers

3.4. To restore BG1NY line to service after automatic outage

If BG1NY line trips auto due to fault:

BG29 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 NY82 Operator to energize) the line **ONCE** by closing 82L1A and 82L1D breakers
- Close (or advise the BG29 Operator to close) 29L1A breaker

BG29 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 TM2BG line out of service

SCC shall carry out (or advise the BG29 Operator to carry out) the following:

- Verify opened 29L2A-D transfer disconnect switch
- Open 29L2A breaker

SCC shall carry out (or advise the TM28 Operator to carry out) the following:

- Verify opened 28L2A -D transfer disconnect switch
- Open 28L2A breaker
- Check for no potential on TM2BG line

3.6. To take out, isolate and de-energize TM2BG line for work

- BG29 Operator shall request for Station Guarantee from TM28

SCC shall carry out (or advise the BG29 Operator to carry out) the following:

- Check opened 29L2A-D transfer disconnect switch
- Open 29L2A breaker

SCC shall carry out (or advise TM28 Operator to carry out) the following:

- Check opened 28L2A-D transfer disconnect switch
- Open 28L2A breaker
- Check for no potential on TM2BG line

SCC shall advise TM28 Operator to carry out the following:

- Open 28L2A-L2 disconnect switch and turn off its 125Vdc supply
- Close 28TM2BG-G ground disconnect switch

SCC shall advise BG29 Operator to carry out the following:

- Open 29L2A-L2 disconnect switch and turn off its 125Vdc supply
- Close 29TM2BG-G ground disconnect switch

3.7. To restore TM2BG line to service after work

3.7.1. Prepare TM2BG line for restoration:

BG29 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 TM2BG line

SCC shall advise TM28 Operator to carry out the following:

- Check opened 28L2A-D transfer disconnect switch
- Check opened 28L2A breaker
- Open 28TM2BG-G ground disconnect switch
- Turn on 125Vdc supply and close 28L2A-L2 disconnect switch

SCC shall advise BG29 Operator to carry out the following:

TECHNICAL DIRECTIVES

- Check opened 29L2-D transfer disconnect switch and turn off its 125Vdc supply
- Check opened 29L2A breaker
- Open 29TM2BG-G ground disconnect switch
- Turn on 125Vdc supply and close 29L2A-L2 disconnect switch

3.7.2. Restoration of TM2BG line to service:

SCC shall:

- Advise the TM28 and BG29 Operators of readiness to restore TM2BG line to service
- Close (or advise the TM28 Operator to close) 28L2A breaker
- Close (or advise the BG29 Operator to close) 29L2A breaker

3.8. To take out, isolate and de-energize TM2BG line for work (Along Powered Skywire)

- BG29 Operator shall request for Station Guarantee from TM28 and NEDCo

SCC shall carry out (or advise the BG29 Operator to carry out) the following:

- Check opened 29L2A-D transfer disconnect switch
- Open 29L2A breaker

SCC shall carry out (or advise TM28 Operator to carry out) the following:

- Check opened 28L2A-D transfer disconnect switch
- Open 28L2A breaker
- Check for no potential on TM2BG line

SCC shall advise TM28 Operator to carry out the following:

- Open 28L2A-L2 disconnect switch and turn off its 125Vdc supply
- Close 28TM2BG-G ground disconnect switch

SCC shall advise BG29 Operator to carry out the following:

- Open 29L2A-L2 disconnect switch and turn off its 125Vdc supply

- Close 29TM2BG-G ground disconnect switch

3.9. To restore TM2BG line to service after work (Along Powered Skywire)

BG29 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 TM2BG line

SCC shall advise TM28 Operator to carry out the following:

- Check opened 28L2A-D transfer disconnect switch
- Check opened 28L2A breaker
- Open 28TM2BG-G ground disconnect switch
- Turn on 125Vdc supply and close 28L2A-L2 disconnect switch

SCC shall advise BG29 Operator to carry out the following:

- Check opened 29L2-D transfer disconnect switch and turn off its 125Vdc supply
- Check opened 29L2A breaker
- Open 29TM2BG-G ground disconnect switch
- Turn on 125Vdc supply and close 29L2A-L2 disconnect switch

3.9.1. Restoration of TM2BG line to service:

SCC shall:

- Advise the TM28 and BG29 Operators of readiness to restore TM2BG line to service
- Close (or advise the TM28 Operator to close) 28L2A breaker
- Close (or advise the BG29 Operator to close) 29L2A breaker

3.10. To restore TM2BG line to service after automatic outage

If TM2BG line trips auto due to fault:

BG29 Operator shall:

TECHNICAL DIRECTIVES

- 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 TM28 Operator to energize) the line **ONCE** by closing 28L2A breaker
- Close (or advise the BG29 Operator to close) 29L2A breaker

BG29 Operator shall:

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

3.11. To take BG3ZB line out of service

SCC shall carry out (or advise the BG29 Operator to carry out) the following:

- Verify opened 29L3-D transfer disconnect switch
- Open 29AL3 breaker

SCC shall carry out (or advise the ZB53 Operator to carry out) the following:

- Verify opened 53L3-D transfer disconnect switch
- Open 53L3A breaker
- Check for no potential on BG3ZB line

3.12. To take out, isolate and de-energize BG3ZB line for work

- BG29 Operator shall request for Station Guarantee from ZB53

SCC shall carry out (or advise the BG29 Operator to carry out) the following:

- Check opened 29L3-D transfer disconnect switch and turn off its 125Vdc supply
- Open 29AL3 breaker

SCC shall carry out (or advise ZB53 Operator to carry out) the following:

TECHNICAL DIRECTIVES

- Check opened 53L3-D transfer disconnect switch and turn off its 125Vdc supply
- Open 53L3A breaker
- Check for no potential on BG3ZB line

SCC shall advise ZB53 Operator to carry out the following:

- Open 53L3A-L3 disconnect switch and turn off its 125Vdc supply
- Close 53BG3ZB-G ground disconnect switch

SCC shall advise BG29 Operator to carry out the following:

- Open 29AL3-L3 disconnect switch and turn off its 125Vdc supply
- Close 29BG3ZB-G ground disconnect switch

3.13. To restore BG3ZB line to service after work

3.13.1. Prepare BG3ZB line for restoration:

BG29 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 BG3ZB line

SCC shall advise ZB53 Operator to carry out the following:

- Check opened 53L3A breaker
- Check opened 53L3-D transfer disconnect switch and turn off its 125Vdc supply
- Open 53BG3ZB-G ground disconnect switch
- Turn on 125Vdc supply and close 53L3A-L3 disconnect switch

SCC shall advise BG29 Operator to carry out the following:

- Check opened 29AL3 breaker
- Check open 29L3-D transfer disconnect switch and turn off its 125Vdc supply
- Open 29BG3ZB-G ground disconnect switch

- Turn on 125Vdc supply and close 29AL3-L3 disconnect switch

3.13.2. Restoration of BG3ZB line to service:

SCC shall:

- Advise the ZB53 and BG29 Operators of readiness to restore BG3ZB line to service
- Close (or advise the BG29 Operator to close) 29AL3 breaker
- Close (or advise the ZB53 Operator to close) 53L3A breaker

3.14. To restore BG3ZB line to service after automatic outage

If BG3ZB line trips auto due to fault:

BG29 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 ZB53 Operator to energize) the line **ONCE** by closing 53L3A breaker
- Close (or advise the BG29 Operator to close) 29AL3 breaker

BG29 Operator shall:

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

3.15. To take BG4NY line out of service

SCC shall carry out (or advise the BG29 Operator to carry out) the following:

- Verify opened 29L4-D transfer disconnect switch

TECHNICAL DIRECTIVES

- Open 29L4A breaker

SCC shall carry out (or advise the NY82 Operator to carry out) the following:

- Open 82L4A and 82L4R2 breakers
- Check for no potential on BG4NY line

3.16. To take out, isolate and de-energize BG4NY line for work

- BG29 Operator shall request for Station Guarantee from NY82

SCC shall carry out (or advise NY82 Operator to carry out) the following:

- Open 82L4A and 82L4R2 breakers

SCC shall carry out (or advise the BG29 Operator to carry out) the following:

- Check opened 29L4-D transfer disconnect switch
- Open 29L4A breaker
- Check for no potential on BG4NY line

SCC shall advise NY82 Operator to carry out the following:

- Open 82L4A-L4 and 82L4R2-L4 disconnect switches and turn off its 125Vdc supply
- Close 82BG4NY-G ground disconnect switch

SCC shall advise BG29 Operator to carry out the following:

- Open 29L4A-L4 disconnect switch and turn off its 125Vdc supply
- Close 29BG4NY-G ground disconnect switch

3.17. To restore BG4NY line to service after work

3.17.1. Prepare BG4NY line for restoration:

BG29 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 BG4NY line

SCC shall advise NY82 Operator to carry out the following:

TECHNICAL DIRECTIVES

- Check opened 82L4A and 82L4R2 breakers
- Open 82BG4NY-G ground disconnect switch
- Turn on 125Vdc supply and close 82L4A-L4 and 82L4R2-L4 disconnect switches

SCC shall advise BG29 Operator to carry out the following:

- Check opened 29L4A breaker
- Open 29BG4NY-G ground disconnect switch
- Check opened 29L4-D disconnect switch and turn off its 125Vdc supply
- Turn on 125Vdc supply and close 29L4A-L4 disconnect switch

3.17.2. Restoration of BG4NY line to service:

SCC shall:

- Advise the NY82 and BG29 Operators of readiness to restore BG4NY line to service
- Close (or advise the NY82 Operator to close) 82L4A and 82L4R2 breakers
- Close (or advise the BG29 Operator to close) 29L4A breaker

3.18. To restore BG4NY line to service after automatic outage

If BG4NY line trips auto due to fault:

BG29 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 NY82 Operator to energize) the line **ONCE** by closing 82L4A and 82L4R2 breakers
- Close (or advise the BG29 Operator to close) 29L4A breaker

BG29 Operator shall:

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

3.19. To isolate 29T1 Transformer for work

BG29 Operator shall request Station Guarantee from Customers on 29B1 and 29Y1 Buses

SCC shall advise BG29 Operator to carry out the following:

- Inform customers about readiness to take off 29T1 bank
- Request customers on 29T1 Bank to take off their load
- Transfer Station Service supply from AC1 to AC2, if Station Service is on 29T1
- Open AC1 Contactor/MCB to take off supply to 29T1 transformer auxiliaries

SCC shall carry out (or advise BG29 Operator to carry out) the following:

- Open 29T1F1 breaker
- Open 29T1F3 breaker
- Open 29AT1 breaker

SCC shall advise BG29 Operator to carry out the following:

- Check opened 29D-T1 transfer disconnect switch and turn off its 125Vdc supply
- Open 29T1F1-T1 disconnect switch
- Open 29T1F3-T1 disconnect switch
- Open 29AT1-T1 disconnect switch and turn off its 125Vdc supply
- Open AC control MCB to 29T1 auxiliaries and tag
- Open 125V DC MCB to 29T1 primary and secondary protection and tag with PC13
- Check for no potential on 29T1 Bank

3.20. To restore 29T1 Bank to service after work

3.20.1. Prepare 29T1 bank for restoration:

BG29 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 29T1 Bank and temporary grounds removed
- Check opened 29D-T1 transfer disconnect switch and turn on its 125Vdc supply
- Close 29T1F1-T1 disconnect switch
- Close 29T1F3-T1 disconnect switch
- Turn on 125Vdc supply and close 29AT1-T1 disconnect switch
- Close AC control MCB to 29T1 auxiliaries and remove tag
- Close 125V DC MCB to 29T1 primary and secondary protection and remove PC13 tag
- Advise SCC of readiness to restore 29T1 Bank to service

3.20.2. Restoration of 29T1 bank to service:

- SCC shall close (or advise BG29 Operator to close) the 29AT1 breaker
- BG29 Operator shall advise customers of readiness to restore 29T1 bank to service
- SCC shall close (or advise BG29 Operator to close) the 29T1F1 and 29T1F3 breakers

3.21. To restore 29T1 Bank to service after automatic outage

If 29T1 bank trips auto due to fault:

BG29 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 BG29 Operator to energize) the bank **ONCE** by closing 29AT1 breaker

BG29 Operator shall advise Customers of readiness to restore 29F1 and 29F3 buses to service

SCC shall close (or advise BG29 Operator to close) 29T1F1 and 29T1F3 breakers

BG29 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. (Refer to **4. Explanation**).

3.22. To isolate 29T2 Transformer for work

BG29 Operator shall request Station Guarantee from customer on 29B2 and 29Y2 Buses

SCC shall advise BG29 Operator to carry out the following:

- Inform customers about readiness to take off 29T2 Bank
- Request customers on 29T1 Bank to take off their load
- Transfer Station Service supply from AC2 to AC1, if Station Service is on 29T2
- Open AC1 Contactor/MCB to take off supply to 29T2 transformer auxiliaries

SCC shall carry out (or advise BG29 Operator to carry out) the following:

- Open 29T2F2 breaker
- Open 29T2F4 breaker
- Open 29T2F5 breaker
- Open 29AT2 breaker
- Check opened 29D-T2 disconnect switch and turn off its 125Vdc supply
- Open 29T2F2-T2 disconnect switch
- Open 29T2F4-T2 disconnect switch

- Open 29T2F5-T2 disconnect switch
- Open 29AT2-T2 disconnect switch and turn off its 125Vdc supply
- Open AC control MCB to 29T2 auxiliaries and tag
- Open 125V DC MCB to 29T2 primary and secondary protection and tag with PC13
- Check for no potential on 29T2 Bank

3.23. To restore 29T2 Bank to service after work

3.23.1. Prepare 29T2 bank for restoration:

BG29 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 29T2 Bank and temporary grounds removed
- Check opened 29D-T2 disconnect switch and turn on its 125Vdc supply
- Close 29T2F2-T2 disconnect switch
- Close 29T2Y4-T2 disconnect switch
- Close 29T2F5-T2 disconnect
- Turn on 125Vdc supply and close 29AT2-T2 disconnect switch
- Close AC control MCB to 29T2 auxiliaries and tag
- Close 125V DC MCB to 29T2 primary and secondary protection and tag with PC13
- Advise SCC of readiness to restore 29T2 Bank to service

3.23.2. Restoration of 29T2 bank to service:

- SCC shall close (or advise BG29 Operator to close) 29AT2 breaker
- BG29 Operator shall advise customers of readiness to restore 29T2 bank to service
- SCC shall close (or advise BG29 Operator to close) the 29T2F2, 29T2F4 and 29T2F5 breakers

3.24. To restore 29T2 Bank to service after automatic outage

If 29T2 bank trips auto due to fault:

BG29 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 BG29 Operator to energize) the bank **ONCE** by closing 29AT2 breaker

BG29 Operator shall advise Customers of readiness to restore 29F2, 29F4 and 29F5 buses to service

SCC shall close (or advise BG29 Operator to close) 29T2F2, 29T2F4 and 29T2F5 breakers

BG29 Operator shall:

- Advise the Supervisor/Area Manager and SCC of item above
- Isolate the Transformer for maintenance men to work on the equipment if the operation above is not successful. (Refer to **4. Explanation.**)

3.25. To isolate 29R1 Reactor for work

SCC shall carry out (or advise BG29 Operator to carry out) the following:

- Place 29R1 Reactor at tap position 1
- Open MCB to take off supply to 29R1 Reactor auxiliaries
- Check opened 29D-R1 transfer disconnect switch and turn off its 125Vdc supply
- Open 29AR1 breaker
- Open 29AR1-R1 disconnect switch and turn off its 125Vdc supply
- Open AC control MCB to 29R1 auxiliaries and tag
- Open 125V DC MCB to 29R1 primary and secondary protection and tag with PC13
- Check for no potential on 29R1

3.26. To restore 29R1 Reactor to service after work

3.26.1. Prepare 29R1 Reactor for restoration:

BG29 Operator shall:

- Check for no potential on 29R1 Reactor and temporary grounds removed
- Check opened 29D-R1 transfer disconnect switch and turn on its 125Vdc supply
- Turn on 125Vdc supply and close 29AR1-R1 disconnect switch
- Close AC control MCB to 29R1 auxiliaries and remove tag
- Close 125V DC MCB to 29R1 primary and secondary protection and tag with PC13
- Advise SCC of readiness to restore 29R1 Reactor to service

3.26.2. Restoration of 29R1 bank to service:

- SCC shall close (or advise BG29 Operator to close) 29AR1 breaker if the voltage is above 174.28kV

3.27. To Isolate 29T1F1 Breaker for work

- BG29 Operator shall request Station Guarantee from Customer on 29B1 Bus

SCC shall advise BG29 Operator to carry out the following:

- Inform customers about readiness to take off 29T1 Bank
- Request customers on 29T1 Bank to take off their load
- Transfer Station Service from AC1 to AC2, if Station Service is on 29T1 Bank
- Open AC1 Contactor/MCB to take off supply to 29T1 transformer auxiliaries

SCC shall carry out (or advise BG29 Operator to carry out) the following:

- Open 29AT1 breaker
- Open 29T1F1 breaker

- Open 29T1F3 breaker

SCC shall advise BG29 Operator to carry out the following:

- Check opened 29D-T1 transfer disconnect switch and turn off its 125Vdc supply
- Open 29T1F1-T1 disconnect switch
- Open 29T1F1-F1 disconnect switch
- Open 29AT1-T1 disconnect switch
- Check for no potential on 29T1 Bank

3.28. To restore 29T1F1 Breaker to service after work

3.28.1. Prepare 29T1F1 breaker for restoration:

BG29 Operator shall:

- Advise SCC when work on the 29T1F1 breaker has been completed and permit(s) surrendered (including all Station Guarantees)
- Check for no potential on 29T1F1 Breaker and temporary grounds removed
- Check opened 29D-T1 transfer disconnect switch and turn on its 125Vdc supply
- Close 29T1F1-T1 disconnect switch
- Close 29T1F1-F1 disconnect switch
- Turn on 125Vdc supply and close 29AT1-T1 disconnect switch

3.28.2. Restoration of 29T1F1 breaker to service:

- SCC shall close (or advise BG29 Operator to close) the 29AT1 breaker
- BG29 Operator shall advise Customer of readiness to restore 29T1F1 breaker to service
- SCC shall close (or advise BG29 Operator to close) the 29T1F1 and 29T1F3 breakers

3.29. To Isolate 29T2F2 Breaker for work

- BG29 Operator shall request for Station Guarantee from Customers on 29F2 and 29F4 Buses

SCC shall advise BG29 Operator to carry out the following:

- Inform customers about readiness to take off 29T2 bank
- Request customers on 29T2 Bank to take off their load
- Transfer Station Service from AC2 to AC1, if Station Service is on 29T2
- Open AC1 Contactor/MCB to take off supply to 29T2 transformer auxiliaries

SCC shall carry out (or advise BG29 Operator to carry out) the following:

- Open 29T2F2 breaker
- Open 29T2F4 breaker
- Open 29AT2 breaker

SCC shall advise BG29 Operator to carry out the following:

- Check opened 29D-T2 transfer disconnect switch and turn off its 125Vdc supply
- Open 29T2F2-T2 disconnect switch
- Open 29T2F2-F2 disconnect switch
- Open 29AT2-T2 disconnect switch
- Check for no potential on 29T2 Bank

3.30. To restore 29T2F2 Breaker to service after work

3.30.1. Prepare 29T2F2 breaker for restoration:

BG29 Operator shall:

- Advise SCC when work on the 29T2F2 breaker has been completed and permit(s) surrendered (including all Station Guarantees)
- Check for no potential on 29T2F2 Breaker and temporary grounds removed
- Check opened 29D-T2 transfer disconnect switch and turn on its 125Vdc supply
- Close 29T2F2-T2 disconnect switch
- Close 29T2F2-F2 disconnect switch

- Close 29AT2-T2 disconnect switch

3.30.2. Restoration of 29T2F2 breaker to service:

- SCC shall close (or advise BG29 Operator to close) the 29AT2 breaker
- BG29 Operator shall advise Customers of readiness to restore 29T2F2 Bus to service
- SCC shall close (or advise BG29 Operator to close) the 29T2F2 and 29T2F4 breakers

3.31. To Isolate 29T1F3 Breaker for work

- BG29 Operator shall request Station Guarantee from customer on 29B2, 29Y2 and 29Y3 Buses

SCC shall advise BG29 Operator to carry out the following:

- Inform customers about readiness to take off 29T1 bank
- Request customers on 29T1 Bank to take off their load
- Transfer Station Service from AC1 to AC2, if Station Service is on 29T1
- Open AC1 Contactor/MCB to take off supply to 29T1 transformer auxiliaries

SCC shall carry out (or advise BG29 Operator to carry out) the following:

- Open 29T1F3 breaker
- Open 29T1F1 breaker
- Open 29AT1 breaker

SCC shall advise BG29 Operator to carry out the following:

- Check opened 29D-T1 transfer disconnect switch and turn off its 125Vdc supply
- Open 29T1F3-T1 disconnect switch
- Open 29T1F3-F3 disconnect switch
- Open 29AT1-T1 disconnect switch and turn off its 125Vdc supply
- Check for no potential on 29T1 Bank

3.32. To restore 29T1F3 Breaker to service after work

3.32.1. Prepare 29T1F3 breaker for restoration:

BG29 Operator shall:

- Advise SCC when work on the 29T1F3 breaker has been completed and permit(s) surrendered (including all Station Guarantees)
- Check for no potential on 29T1F3 Breaker and temporary grounds removed
- Close 29T1F3-T1 disconnect switch
- Close 29T1F3-F3 disconnect switch
- Turn on its 125Vdc supply and close 29AT1-T1 disconnect switch

3.32.2. Restoration of 29T1F3 breaker to service:

- SCC shall close (or advise BG29 Operator to close) the 29AT1 breaker
- BG29 Operator shall advise customers of readiness to restore 29T1F3 Bus to service
- SCC shall close (or advise BG29 Operator to close) the 29T1F1 and 29T1F3 breakers

3.33. To Isolate 29T2F4 Breaker for work

- BG29 Operator shall request Station Guarantee from customer on 29F2, 29F4 and 29F5 Buses

SCC shall advise BG29 Operator to carry out the following:

- Inform customers about readiness to take off 29T2 bank
- Request customers on 29T2 Bank to take off their load
- Transfer Station Service from AC2 to AC1, if Station Service is on 29T2
- Open AC1 Contactor/MCB to take off supply to 29T2 transformer auxiliaries

SCC shall carry out (or advise BG29 Operator to carry out) the following:

- Open 29T2F2 breaker
- Open 29T2F4 breaker
- Open 29T2F5 breaker
- Open 29AT2 breaker

SCC shall advise BG29 Operator to carry out the following:

- Open 29T2F4-T2 disconnect switch
- Open 29T2F4-F4 disconnect switch
- Open 29AT2-T2 disconnect switch and turn off its 125Vdc supply
- Check for no potential on 29T2 Bank

3.34. To restore 29T2Y2 Breaker to service after work

3.34.1. Prepare 29T2Y2 breaker for restoration:

BG29 Operator shall:

- Advise SCC when work on the 29T2Y2 breaker has been completed and permit(s) surrendered (including all Station Guarantees)
- Check for no potential on 29T2Y2 Breaker and temporary grounds removed
- Close 29T2F4-T2 disconnect switch
- Close 29T2F4-F4 disconnect switch
- Turn on its 125Vdc supply and close 29AT2-T2 disconnect switch

3.34.2. Restoration of 29T2Y2 breaker to service:

- SCC shall close (or advise BG29 Operator to close) the 29AT2 breaker
- BG29 Operator shall advise customers of readiness to restore 29T2F4 Bus to service
- SCC shall close (or advise BG29 Operator to close) the 29T2F2, 29T2F4 and 29T2F5 breakers

3.35. To Isolate 29T2F5 Breaker for work

- BG29 Operator shall request Station Guarantee from customer on 29F2, 29F4 and 29F5 Buses

SCC shall advise BG29 Operator to carry out the following:

- Inform customers about readiness to take off 29T2 bank
- Request customers on 29T2 Bank to take off their load

- Transfer Station Service from AC2 to AC1, if Station Service is on 29T2
- Open AC1 Contactor/MCB to take off supply to 29T2 transformer auxiliaries

SCC shall carry out (or advise BG29 Operator to carry out) the following:

- Open 29T2F2 breaker
- Open 29T2F4 breaker
- Open 29T2F5 breaker
- Open 29AT2 breaker

SCC shall advise BG29 Operator to carry out the following:

- Open 29T2F2-T2 disconnect switch
- Open 29T2F2-F5 disconnect switch
- Open 29AT2-T2 disconnect switch and turn off its 125Vdc supply
- Check for no potential on 29T2 Bank

3.36. To restore 29T2F5 Breaker to service after work

3.36.1. Prepare 29T2F5 breaker for restoration:

BG29 Operator shall:

- Advise SCC when work on the 29T2F5 breaker has been completed and permit(s) surrendered (including all Station Guarantees)
- Check for no potential on 29T2F5 Breaker and temporary grounds removed
- Close 29T2F5-T2 disconnect switch
- Close 29T2F5-F5 disconnect switch
- Turn on its 125Vdc supply and close 29AT2-T2 disconnect switch

3.36.2. Restoration of 29T2F5 breaker to service:

- SCC shall close (or advise BG29 Operator to close) the 29AT2 breaker
- BG29 Operator shall advise customers of readiness to restore 29T2F5 Bus to service

TECHNICAL DIRECTIVES

- SCC shall close (or advise BG29 Operator to close) the 29T2F2, 29T2F4 and 29T2F5 breakers

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 has two 161Kv buses. The main 'A' bus provides the normal points of supply to all circuits such as BG1NY, TM2BG, BG3ZB and BG4NY lines and 29T1 and 29T2 transformers and 29R1 Reactor. The 'D' bus provides the necessary transfer route for only one circuit at a time.

The Reactor with its tap at position 10 allows each line to be shunt compensated and avoid voltage jumps occurring at the receiving end.

5. Approval

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Director, TSD