

TD-OP-0037



OPERATING PROCEDURE FOR MALLAM SUBSTATION

GHANA GRID COMPANY LTD

Title: OPERATING PROCEDURE FOR MALLAM SUBSTATION (M37)		
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1. Purpose

This directive specifies the operations to be carried out to take out of service, isolate or restore equipment at M37 Substation to service for planned and auto outages.

2. Scope

The directive will be used by Operators at Accra Operating Area and System Control Center (SCC) for operation of equipment at M37 Substation.

3. Procedure

3.1. To take C1M line out of service

SCC shall carry out (or advise the M37 Operator to carry out) the following:

- Open 37L1A and 37L1T1 breakers

SCC shall carry out (or advise the C7 Operator to carry out) the following:

- Open 7C1M breaker
- Check for no potential on C1M line

3.2. To take out, isolate and de-energize C1M line for work

- M37 Operator shall request for Station Guarantee from C7

SCC shall carry out (or advise the M37 Operator to carry out) the following:

- Open 37L1A and 37L1T1 breakers

SCC shall carry out (or advise the C7 Operator to carry out) the following:

- Open 7C1M breaker

- Check for no potential on C1M line

SCC shall advise C7 Operator to carry out the following:

- Open 7C1M-L1 disconnect switch and turn off its 125Vdc supply
- Close 7C1M-G ground disconnect switch

SCC shall advise M37 Operator to carry out the following:

- Open 37L1A-L1 and 37L1T1-L1 disconnect switches and turn off 125Vdc supply
- Close 37C1M-G ground disconnect switch

3.3. To restore C1M line to service after work

3.3.1. Prepare C1M line for restoration

M37 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 C1M line

SCC shall advise C7 Operator to carry out the following

- Check opened 7C1M breaker
- Open 7C1M-G ground disconnect switch
- Turn on 125Vdc supply and close 7C1M-L1 disconnect switch

SCC shall advise M37 Operator to carry out the following:

- Check opened 37L1A and 37L1T1 breakers
- Open 37C1M-G ground disconnect switch
- Turn on 125Vdc supply and close 37L1A-L1 and 37L1T1-L1 disconnect switches

3.3.2. Restoration of C1M line to service:

SCC shall:

- Advise the M37 and C7 Operators of readiness to restore C1M line to service
- Close (or advise the C7 Operator to close) 7C1M breaker
- Close (or advise the M37 Operator to close) 37L1A and 37L1T1 breakers

3.4. To restore C1M line to service after automatic outage

If C1M line trips auto due to fault:

M37 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 C7 Operator to energize) the line **ONCE** by closing 7C1M breaker
- Close (or advise the M37 Operator to close) 37L1A and 37L1T1 breakers

M37 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 W2M line out of service

SCC shall carry out (or advise the M37 Operator to carry out) the following:

- Open 37L2A and 37L2L4 breakers

SCC shall carry out (or advise the W6 Operator to carry out) the following:

- Open 6W2M breaker
- Check for no potential on W2M line

3.6. To take out, isolate and de-energize W2M line for work

- M37 Operator shall request for Station Guarantee from W6

SCC shall carry out (or advise the M37 Operator to carry out) the following:

- Open 37L2A and 37L2L4 breakers

SCC shall carry out (or advise the W6 Operator to carry out) the following:

- Open 6W2M breaker
- Check for no potential on W2M line

SCC shall advise W6 Operator to carry out the following:

- Open 6W2M-L2 disconnect switch and turn off its 125Vdc supply
- Close 6W2M-G ground disconnect switch

SCC shall advise M37 Operator to carry out the following:

- Open 37L2A-L2 and 37L2L4-L2 disconnect switches and turn off 125Vdc supply
- Close 37W2M-G ground disconnect switch

3.7. To restore W2M line to service after work

3.7.1. Prepare W2M line for restoration

M37 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 W2M line

SCC shall advise W6 Operator to carry out the following

- Check opened 6W2M breaker
- Open 6W2M-G ground disconnect switch

- Turn on 125Vdc supply and close 6W2M-L2 disconnect switch

SCC shall advise M37 Operator to carry out the following:

- Check opened 37L2A and 37L2L4 breakers
- Open 37W2M-G ground disconnect switch
- Turn on 125Vdc supply and close 37L2A-L2 and 37L2L4-L2 disconnect switches
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3.7.2. Restoration of W2M line to service:

SCC shall:

- Advise the M37 and W6 Operators of readiness to restore W2M line to service
- Close (or advise the W6 Operator to close) 6W2M breaker
- Close (or advise the M37 Operator to close) 37L2A and 37L2L4 breakers

3.8. To restore W2M line to service after automatic outage

If W2M line trips auto due to fault:

M37 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 W6 Operator to energize) the line **ONCE** by closing 6W2M breaker
- Close (or advise the M37 Operator to close) 37L2A and 37L2L4 breakers

M37 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 take H4M line out of service

SCC shall carry out (or advise the M37 Operator to carry out) the following:

- Open 37DL4 and 37L2L4 breakers

SCC shall carry out (or advise the H5 Operator to carry out) the following:

- Open 5L4L5 and 5DL4 breaker
- Check for no potential on H4M line

3.10. To take out, isolate and de-energize H4M line for work

- M37 Operator shall request for Station Guarantee from H5

SCC shall carry out (or advise the M37 Operator to carry out) the following:

- Open 37DL4 and 37L2L4 breakers

SCC shall carry out (or advise the H5 Operator to carry out) the following:

- Open 5L4L5 and 5DL4 breakers
- Check for no potential on H4M line

SCC shall advise H5 Operator to carry out the following:

- Check opened 5L4L5 and 5DL4 breakers
- Open 5L4L5-L4 and 5DL4-L4 disconnect switches and turn off 125Vdc supply
- Close 5H4M-G ground disconnect switch

SCC shall advise M37 Operator to carry out the following:

- Check opened 37DL4 and 37L2L4 breakers
- Open 37DL4-L4 and 37L2L4-L4 disconnect switches and turn off 125Vdc supply
- Close 37H4M-G ground disconnect switch
-

3.11. To restore H4M line to service after work

3.11.1. Prepare H4M line for restoration

M37 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 H4M line

SCC shall advise H5 Operator to carry out the following

- Check opened 5L4L5 and 5DL4 breakers
- Open 5H4M-G ground disconnect switch
- Turn on 125Vdc supply and close 5L4L5-L4 and 5DL4-L4 disconnect switches

SCC shall advise M37 Operator to carry out the following:

- Check opened 37DL4 and 37L2L4 breakers
- Open 37H4M-G ground disconnect switch
- Turn on 125Vdc supply and close 37DL4-L4 and 37L2L4-L4 disconnect switches

3.11.2. Restoration of H4M line to service:

SCC shall:

- Advise the M37 and H5 Operators of readiness to restore H4M line to service
- Close (or advise the H5 Operator to close) 5L4L5 and 5DL4 breakers
- Close (or advise the M37 Operator to close) 37DL4 and 37L2L4 breakers

3.12. To restore H4M line to service after automatic outage

If H4M line trips auto due to fault:

M37 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 H5 Operator to energize) the line **ONCE** by closing 5L4L5 and 5DL4 breakers
- Close (or advise the M37 Operator to close) 37DL4 and 37L2L4 breakers

M37 Operator shall:

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

3.13. To take AC5M line out of service

SCC shall carry out (or advise the M37 Operator to carry out) the following:

- Open 37DL5 and 37L5T2 breakers

SCC shall carry out (or advise the AC83 Operator to carry out) the following:

- Open 83AC5M breaker
- Check for no potential on AC5M line

3.14. To take out, isolate and de-energize AC5M line for work

- M37 Operator shall request for Station Guarantee from AC83

SCC shall carry out (or advise the M37 Operator to carry out) the following:

- Open 37DL5 and 37L5T2 breakers

SCC shall carry out (or advise the AC83 Operator to carry out) the following:

- Open 83AC5M breaker
- Check for no potential on AC5M line

SCC shall advise AC83 Operator to carry out the following:

- Check opened 83AC5M breaker
- Open 83AC5M-L5 disconnect switch and turn off its 125Vdc supply
- Close 83AC5M-G ground disconnect switch

SCC shall advise M37 Operator to carry out the following:

- Check opened 37DL5 and 37L5T2 breakers
- Open 37DL5-L5 and 37L5T2-L5 disconnect switches and turn off 125Vdc supply
- Close 37AC5M-G ground disconnect switch

3.15. To restore AC5M line to service after work

3.15.1. Prepare AC5M line for restoration

M37 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 AC5M line

SCC shall advise AC83 Operator to carry out the following

- Check opened 83AC5M breaker
- Open 83AC5M-G ground disconnect switch
- Turn on 125Vdc supply and close 83AC5M-L5 disconnect switch

SCC shall advise M37 Operator to carry out the following:

- Check opened 37DL5 and 37L5T2 breakers
- Open 37AC5M-G ground disconnect switch
- Turn on 125Vdc supply and close 37DL5-L5 and 37L5T2-L5 disconnect switches

3.15.2. Restoration of AC5M line to service:

SCC shall:

- Advise the M37 and AC83 Operators of readiness to restore AC5M line to service
- Close (or advise the AC83 Operator to close) 83AC5M breaker
- Close (or advise the M37 Operator to close) 37DL5 and 37L5T2 breakers

3.16. To restore AC5M line to service after automatic outage

If AC5M line trips auto due to fault:

M37 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 AC83 Operator to energize) the line **ONCE** by closing 83AC5M breaker
- Close (or advise the M37 Operator to close) 37DL5 and 37L5T2 breakers

M37 Operator shall:

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

3.17. Isolate 37T1 Transformer for work

H5 Operator shall request for Station Guarantee from Customer on 37F1 Feeder

SCC shall advise M37 operator to carry out the following:

- Inform Customer about readiness to take off 37T1 bank
- Request Customer on 37T1 Bank to take off their load

- Transfer Station Service from AC1 to AC2
- Open AC1 Contactor/MCB to take off supply to 37T1 transformer auxiliaries

SCC shall carry out (or advise M37 operator to carry out) the following:

- Open 37T1F1 breaker
- Open 37L1T1 and 37DT1 breakers
- Check for no potential on 37T1 Bank

SCC shall advise M37 operator to carry out the following:

- Open 37DT1-T1 and 37L1T1-T1 disconnect switches and turn off 125Vdc supply
- Open 37T1F1-F1 disconnect switch
- Open AC control MCB to 37T1 auxiliaries and tag
- Open 125Vdc MCB to 37T1 primary and secondary protection and tag with PC13

3.18. To restore 37T1 Bank to service after work

3.18.1. Prepare 37T1 bank for restoration:

- Advise SCC when work on the transformer has been completed and permit(s) surrendered (including all Station Guarantees)
- Check for no potential on 37T1 Bank and temporary grounds removed
- Check opened 37T1F1 breaker
- Check opened 37L1T1 and 37DT1 breakers
- Turn on 125Vdc supply and close 37L1T1-T1 and 37DT1-T1 disconnect switches
- Close 37T1F1-F1 disconnect switch
- Close AC control MCB to 37T1 auxiliaries and remove tag

- Close 125Vdc MCB to 37T1 primary and secondary protection and remove PC13 tag
- Advise SCC of readiness to restore 37T1 Bank to service

3.18.2. Restoration of 37T1 bank to service:

- SCC shall close (or advise M37 operator to close) 37L1T1 and 37DT1 breakers
- M37 Operator shall advise Customer of readiness to restore 37T1 Bank to service
- SCC shall close (or advise M37 operator to close) the 37T1F1 breaker

3.19. Restore 37T1 Bank to service after automatic outage

If 37T1 bank trips auto due to fault:

- 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 M37 Operator to energize) the bank **ONCE** by closing 37DT1 and 37L1T1 breaker

M37 Operator shall advise Customer of readiness to restore 37F1 feeder to service

SCC shall close (or advise M37 Operator to close) 37T1F1 breaker

M37 Operator shall:

- Advise the Supervisor/Area Manager of item above
- If not successful, isolate the Transformer for maintenance men to work on the equipment. See explanation.

3.20. To isolate 37T2 Transformer for work

- M37 Operator shall request Station Guarantee from Customer on 37F2 Feeder

SCC shall carry out or advise M37 Operator to carry out the following:

- Inform Customer about readiness to take off 37T2 Bank
- Request Customer on 37T2 Bank to take off their load
- Transfer Station Service from AC2 to AC1, if Station Service is on 37T2
- Open AC2 Contactor/MCB to take off supply to 37T2 transformer auxiliaries

SCC shall carry out (or advise M37 Operator to carry out) the following:

- Open 37SC2F2 breaker
- Open 37T2F2 breaker
- Open 37L5T2 and 37AT2 breakers
- Check for no potential on 37T2 Bank
- Open 37SC2F2-F2 disconnect switch and turn off its 125Vdc supply
- Open 37T2F2-F2 disconnect switch and turn off its 125Vdc supply

- Open 37L5T2-T2 and 37AT2-T2 disconnect switches and turn off 125Vdc supply
- Open AC control MCB to 37T2 auxiliaries and tag
- Open 125V DC MCB to 37T2 primary and secondary protection and tag with PC13

3.21. To restore 37T2 Bank to service after work

3.21.1. Prepare 37T2 Bank to service after work

M37 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 37T2 Bank and temporary grounds removed
- Turn on 125Vdc supply and close 37SC2F2-F2 disconnect switch
- Close 37T2F2-F2 disconnect switch and turn on its 125Vdc supply
- Turn on 125Vdc supply and close 37L5T2-T2 and 37AT2-T2 disconnect switch
- Close AC control MCB to 37T2 auxiliaries and remove tag
- Close 125V DC MCB to 37T2 primary and secondary protection and remove PC13 tag
- Advise SCC of readiness to restore 37T2 Bank to service

3.21.2. Restoration of 37T2 Bank to service:

- SCC shall close (or advise M37 Operator to close) 37L5T2 and 37AT2 breaker

- M37 Operator shall advise Customer of readiness to restore 37F2 feeder to service
- SCC shall close (or advise M37 Operator to close) 37T2F2 breaker
- SCC shall close (or advise M37 Operator to close) 37SC2F2 breaker if the voltage is below 32.8kV

3.22. To restore 37T2 Bank to service after automatic outage

If 37T2 Bank trips auto due to fault:

M37 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 M37 Operator to energize) the bank ONCE by closing 37L5T2 and 37AT2 breakers

M37 Operator shall advise Customer of readiness to restore 37T2 Bank to service

SCC shall close (or advise M37 Operator to close) 37T2F2 breaker

M37 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.

3.23. Isolate 37T3 Transformer for work

H5 Operator shall request for Station Guarantee from Customer on 37F3 Feeder

SCC shall advise M37 operator to carry out the following:

- Inform Customer about readiness to take off 37T3 bank
- Request Customer on 37T3 Bank to take off their load
- Open AC1 Contactor/MCB to take off supply to 37T3 transformer auxiliaries

SCC shall carry out (or advise M37 operator to carry out) the following:

- Open 37T3F3 breaker
- Open 37T3T4 and 37DT3 breakers
- Check for no potential on 37T3 Bank

SCC shall advise M37 operator to carry out the following:

- Check opened 37T3T4 and 37DT3 breakers
- Open 37DT3-T3 and 37T3T4-T3 disconnect switches and turn off 125Vdc supply

- Open 37T3F3-F3 disconnect switch and turn off its 125Vdc supply
- Open AC control MCB to 37T3 auxiliaries and tag
- Open 125Vdc MCB to 37T3 primary and secondary protection and tag with PC13

3.24. To restore 37T3 Bank to service after work

3.24.1. Prepare 37T3 bank for restoration:

- Advise SCC when work on the transformer has been completed and permit(s) surrendered (including all Station Guarantees)
- Check for no potential on 37T3 Bank and temporary grounds removed
- Check opened 37T3F3 breaker
- Check opened 37T3T4 and 37DT3 breakers
- Turn on 125Vdc supply and close 37T3T4-T3 and 37DT3-T3 disconnect switches
- Turn on 125Vdc supply and close 37T3F3-F3 disconnect switch
- Close AC control MCB to 37T3 auxiliaries and remove tag
- Close 125Vdc MCB to 37T3 primary and secondary protection and remove PC13 tag
- Advise SCC of readiness to restore 37T3 Bank to service

3.24.2. Restoration of 37T3 bank to service:

- SCC shall close (or advise M37 operator to close) 37T3T4 and 37DT3 breakers
- M37 Operator shall advise Customer of readiness to restore 37T3 Bank to service
- SCC shall close (or advise M37 operator to close) the 37T3F3 breaker

3.25. Restore 37T3 Bank to service after automatic outage

If 37T3 bank trips auto due to fault:

- 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 M37 Operator to energize) the bank **ONCE** by closing 37DT3 and 37T3T4 breaker

M37 Operator shall advise Customer of readiness to restore 37F3 feeder to service

SCC shall close (or advise M37 Operator to close) 37T3F3 breaker

M37 Operator shall:

- Advise the Supervisor/Area Manager of item above
- If not successful, isolate the Transformer for maintenance men to work on the equipment. See explanation.

3.26. To isolate 37T4 Transformer for work

- M37 Operator shall request Station Guarantee from Customer on 37F4 Feeder

SCC shall carry out or advise M37 Operator to carry out the following:

- Inform Customer about readiness to take off 37T4 Bank
- Request Customer on 37T4 Bank to take off their load

- Open AC4 Contactor/MCB to take off supply to 37T4 transformer auxiliaries

SCC shall carry out (or advise M37 Operator to carry out) the following:

- Open 37SC4F4 breaker
- Open 37T4F4 breaker
- Open 37T3T4 and 37AT4 breakers
- Check for no potential on 37T4 Bank
- Open 37SC4F4-F4 disconnect switch and turn off its 125Vdc supply
- Open 37T4F4-F4 disconnect switch and turn off its 125Vdc supply
- Open 37T3T4-T4 and 37AT4-T4 disconnect switches and turn off 125Vdc supply
- Open AC control MCB to 37T4 auxiliaries and tag
- Open 125V DC MCB to 37T4 primary and secondary protection and tag with PC13

3.27. To restore 37T4 Bank to service after work

3.27.1. Prepare 37T4 Bank to service after work

M37 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 37T4 Bank and temporary grounds removed

- Turn on 125Vdc supply and close 37SC4F4-F4 disconnect switch
- Turn on 125Vdc supply and close 37T4F4-F4 disconnect switch
- Turn on 125Vdc supply and close 37T3T4-T4 and 37AT4-T4 disconnect switch
- Close AC control MCB to 37T4 auxiliaries and remove tag
- Close 125V DC MCB to 37T4 primary and secondary protection and remove PC13 tag
- Advise SCC of readiness to restore 37T4 Bank to service

3.27.2. Restoration of 37T4 Bank to service:

- SCC shall close (or advise M37 Operator to close) 37T3T4 and 37AT4 breakers
- M37 Operator shall advise Customer of readiness to restore 37F4 feeder to service
- SCC shall close (or advise M37 Operator to close) 37T4F4 breaker
- SCC shall close (or advise M37 Operator to close) 37SC2F4 breaker if the voltage is below 32.8kV

3.28. To restore 37T4 Bank to service after automatic outage

If 37T4 Bank trips auto due to fault:

M37 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 M37 Operator to energize) the bank ONCE by closing 37T3T4 and 37AT4 breakers

M37 Operator shall advise Customer of readiness to restore 37T4 Bank to service

SCC shall close (or advise M37 Operator to close) 37T4F4 breaker

M37 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.

3.29. To isolate 37SC2 Capacitor Bank for work

SCC shall carry out or advise W6 Operator to carry out the following:

- Open 37SC2F2 breaker
- Open 37SC2F2-SC2 disconnect switch and turn off its 125Vdc supply
- Close 37SC2F2-G ground disconnect switch

3.30. To restore 37SC2 Capacitor Bank to service after work

3.30.1. Prepare 37SC2 Capacitor Bank to service after work

- Advise SCC when work on the 37SC2 Capacitor Bank has been completed and permit(s) surrendered (including all Station Guarantees)
- Check for no potential on 37SC2F2 Capacitor Bank and grounds removed
- Check opened 37SC2F2 breaker
- Open 37SC2F2-G ground disconnect switch
- Turn on 125Vdc supply and close 37SC2F2-SC2 disconnect switch
- Advise SCC of readiness to restore 37SC2 Capacitor bank to service

3.30.2. Restoration of 37SC2 Capacitor Bank to service:

- SCC shall close (or advise W6 Operator to close) 37SC2F2 breaker if the voltage is below 32.8kV

3.31. To isolate 37SC4 Capacitor Bank for work

SCC shall carry out or advise M37 Operator to carry out the following:

- Open 37SC4F4 breaker
- Open 37SC4F4-SC4 disconnect switch and turn off its 125Vdc supply
- Close 37SC4F4-G ground disconnect switch

3.32. To restore 37SC4 Capacitor Bank to service after work

3.32.1. Prepare 37SC4 Capacitor Bank to service after work

- Advise SCC when work on the 37SC4 Capacitor Bank has been completed and permit(s) surrendered (including all Station Guarantees)
- Check for no potential on 37SC4F4 Capacitor Bank and grounds removed
- Check opened 37SC4F4 breaker
- Open 37SC4F4-G ground disconnect switch
- Turn on 125Vdc supply and close 37SC4F4-SC4 disconnect switch
- Advise SCC of readiness to restore 37SC4 Capacitor bank to service

3.32.2. Restoration of 37SC4 Capacitor Bank to service:

- SCC shall close (or advise M37 Operator to close) 37SC4F4 breaker if the voltage is below 32.8kV

3.33. To isolate 37T1F1 Breaker for work

- M37 Operator shall request Station Guarantee from Customer on 37F1 Feeder

SCC shall carry out or advise M37 Operator to carry out the following:

- Inform Customer about readiness to take off 37T1 bank

- Request Customer on 37T1 Bank to take off their load
- Transfer Station Service from AC1 to AC2, if Station Service is on 37T1
- Open AC1 Contactor/MCB to take off supply to 37T1 transformer auxiliaries

SCC shall carry out (or advise M37 Operator to carry out) the following:

- Open 37T1F1 breaker
- Open 37L1T1 and 37DT1 breakers
- Open 37T1F1-F1 disconnect switch and turn off its 125Vdc supply
- Open 37L1T1-T1 and 37DT1-T1 disconnect switches and turn off its 125Vdc supply

3.34. To restore 37T1F1 Breaker to service after work

3.34.1. Prepare 37T1F1 Breaker to service after work

M37 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 37T1 Bank and temporary grounds removed
- Turn on 125Vdc supply and close 37T1F1-F1 disconnect switch
- Turn on 125Vdc supply and close 37L1T1-T1 and 37DT1-T1 disconnect switches
- Advise SCC of readiness to restore 37T1F1 breaker to service

3.34.2. Restoration of 37T1F1 Breaker to service:

- SCC shall close (or advise M37 Operator to close) 37L1T1 and 37DT1 breaker
- M37 Operator shall advise Customer of readiness to restore 37F1 feeder to service
- SCC shall close (or advise M37 Operator to close) 37T1F1 breaker

3.35. To isolate 37T2F2 Breaker for work

- M37 Operator shall request Station Guarantee from Customer on 37F1 Feeder

SCC shall carry out or advise M37 Operator to carry out the following:

- Inform Customer about readiness to take off 37T2 bank
- Request Customer on 37T2 Bank to take off their load
- Transfer Station Service from AC2 to AC1, if Station Service is on 37T2
- Open AC1 Contactor/MCB to take off supply to 37T2 transformer auxiliaries

SCC shall carry out (or advise M37 Operator to carry out) the following:

- Open 37SC2F2 breaker
- Open 37T2F2 breaker
- Open 37L5T2 and 37AT2 breakers

- Open 37T2F2-F2 disconnect switch and turn off its 125Vdc supply
- Open 37L5T2-T2 and 37AT2-T2 disconnect switches and turn off its 125Vdc supply

3.36. To restore 37T2F2 breaker to service after work

3.36.1. Prepare 37T2F2 breaker to service after work

M37 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 37T2 Bank and temporary grounds removed
- Turn on 125Vdc supply and close 37T2F2-F2 disconnect switch
- Turn on 125Vdc supply and close 37L5T2-T2 and 37AT2-T2 disconnect switches
- Advise SCC of readiness to restore 37T2F2 breaker to service

3.36.2. Restoration of 37T2F2 Breaker to service:

- SCC shall close (or advise M37 Operator to close) 37L5T2 and 37AT2 breaker
- M37 Operator shall advise Customer of readiness to restore 37F2 feeder to service
- SCC shall close (or advise M37 Operator to close) 37T2F2 breaker
- SCC shall close (or advise M37 Operator to close) 37SC2F2 breaker, if the voltage is below 32.8kV

3.37. To isolate 37T3F3 Breaker for work

- M37 Operator shall request Station Guarantee from Customer on 37F3 Feeder

SCC shall carry out or advise M37 Operator to carry out the following:

- Inform Customer about readiness to take off 37T3 bank
- Request Customer on 37T3 Bank to take off their load
- Open AC1 Contactor/MCB to take off supply to 37T3 transformer auxiliaries

SCC shall carry out (or advise M37 Operator to carry out) the following:

- Open 37T3F3 breaker
- Open 37T3T4 and 37DT3 breakers
- Open 37T3F3-F3 disconnect switch and turn off its 125Vdc supply
- Open 37T3T4-T3 and 37DT3-T3 disconnect switches and turn off its 125Vdc supply

3.38. To restore 37T3F3 breaker to service after work

3.38.1. Prepare 37T3F3 breaker to service after work

M37 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 37T3 Bank and temporary grounds removed
- Turn on 125Vdc supply and close 37T3F3-F3 disconnect switch
- Turn on 125Vdc supply and close 37T3T4-T3 and 37DT3-T3 disconnect switches
- Advise SCC of readiness to restore 37T3F3 breaker to service

3.38.2. Restoration of 37T3F3 Breaker to service:

- SCC shall close (or advise M37 Operator to close) 37T3T4 and 37DT3 breaker
- M37 Operator shall advise Customer of readiness to restore 37F3 feeder to service
- SCC shall close (or advise M37 Operator to close) 37T3F3 breaker

3.39. To isolate 37T4F4 Breaker for work

- M37 Operator shall request Station Guarantee from Customer on 37F4 Feeder

SCC shall carry out or advise M37 Operator to carry out the following:

- Inform Customer about readiness to take off 37T4 bank
- Request Customer on 37T4 Bank to take off their load
- Open AC4 Contactor/MCB to take off supply to 37T4 transformer auxiliaries

SCC shall carry out (or advise M37 Operator to carry out) the following:

- Open 37SC4F4 breaker
- Open 37T4F4 breaker
- Open 37T3T4 and 37AT4 breakers
- Open 37T4F4-F4 disconnect switch and turn off its 125Vdc supply
- Open 37T3T4-T4 and 37AT4-T4 disconnect switches and turn off 125Vdc supply

3.40. To restore 37T4F4 breaker to service after work

3.40.1. Prepare 37T4F4 breaker to service after work

M37 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 37T4 Bank and temporary grounds removed

3.40.2. Turn on 125Vdc supply and close 37T4F4-F4 disconnect switch

- Turn on 125Vdc supply and close 37T3T4-T4 and 37AT2-T4 disconnect switches
- Advise SCC of readiness to restore 37T4F4 breaker to service

3.40.3. Restoration of 37T4F4 Breaker to service:

- SCC shall close (or advise M37 Operator to close) 37T3T4 and 37AT4 breaker
- M37 Operator shall advise Customer of readiness to restore 37F4 feeder to service

- SCC shall close (or advise M37 Operator to close) 37T4F4 breaker
- SCC shall close (or advise M37 Operator to close) 37SC4F4 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 has two 161Kv buses. The main 'A' and 'D' buses, a breaker and half configuration provides the normal points of supply to all circuits/equipment such as C1M , W2M , H4M and AC5M lines, 37T1, 37T2, 37T3 and 37T4 transformers.

5. Approval

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Director, Technical Services