TD-OP-0087

GRIDCo

OPERATING PROCEDURE FOR KASOA SUBSTATION

GHANA GRID COMPANY LTD

Title:	**OPERATING PROCEDURE FOR KASOA SUBSTATION (KS87)**		
Issued To:	Director, System Operations Director, SNS Manager, SCC Manager, Dispatch Operations Area Manager, Tema Operating Staff, Tema Area Maintenance Staff, Tema Area Dispatch Staff, SCC	**Number:**	TD-OP-0087
		Subject Area:	Operating
		Issue Date:	Trial
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Key Words: Take Out, Isolate, Prepare, Energize, Restore, Automatic Outage			

Contents

1. Purpose

This directive specifies the operations to be carried out to take out of service, isolate or restore equipment at KS87 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 KS87 Substation.

3. Procedure

3.1. To take C1KS line out of service

SCC shall carry out (or advise the KS87 Operator to carry out) the following:

- Open 87L1A and 87L1T1 breakers

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

- Open 7C1KS breaker

- Check for no potential on C1KS line

3.2. To take out, isolate and de-energize C1KS line for work

- KS87 Operator shall request for Station Guarantee from C7

SCC shall carry out (or advise the KS87 Operator to carry out) the following:

- Open 87L1A and 87L1T1 breakers

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

- Open 7C1KS breaker

- Check for no potential on C1KS line

SCC shall advise the KS87 Operator to carry out the following:

- Open 87L1A-L1 and 87L1T1-L1 disconnect switches and turn off 125Vdc supply

- Close 87C1KS-G ground disconnect switch

SCC shall advise the C7 Operator to carry out the following:

- Open 7C1KS –L1 disconnect switch and turn off 125Vdc supply

- Close 7C1KS-G ground disconnect switch

3.3. To restore C1KS line to service after work

3.3.1. Prepare C1KS line for restoration

KS87 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 C1KS line

SCC shall advise C7 Operator to carry out the following:

- Check opened 7C1KS breaker

- Open 7C1KS-G ground disconnect switch

- Turn on 125Vdc supply and close 7C1KS-L1 disconnect switch

SCC shall advise KS87 Operator to carry out the following:

- Check opened 87L1A and 87L1T1 breakers

- Open 87C1KS-G ground disconnect switch

- Turn on 125Vdc supply and close 37L1A-L1 and 37L1T1-L1 disconnect switches

3.3.2. Restoration of C1KS line to service:

SCC shall:

- Advise the KS87 and C7 Operators of readiness to restore C1KS line to service

    - Close (or advise C7 operator to close) 7C1KS breaker

    - Close (or advise KS87 operator to close) 87L1A and 87L1T1 breakers

3.4. To restore C1KS line to service after automatic outage

If C1KS line 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 KS87 Operator to energize) the line **ONCE** by closing 87L1A and 87L1T1 breakers

- Close (or advise the C7 Operator to close) 7C1KS 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 W2KS line out of service

SCC shall carry out (or advise the KS87 Operator to carry out) the following:

- Open 87L2A and 87L2T2 breakers

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

- Open 6W2KS breaker

- Check for no potential on W2KS line

3.6. To take out, isolate and de-energize W2KS line for work

- KS87 Operator shall request for Station Guarantee from W6

SCC shall carry out (or advise the KS87 Operator to carry out) the following:

- Open 87L2A and 87L2T2 breakers

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

- Open 6W2KS breaker

- Check for no potential on W2KS line

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

- Open 6W2KS-L2 disconnect switch and turn off its 125Vdc supply

- Close 6W2KS-G ground disconnect switch

SCC shall advise the KS87 Operator to carry out the following:

- Open 87L2A-L2 and 87L2T2-L2 disconnect switches and turn off 125Vdc supply

- Close 87W2KS-G ground disconnect switch

3.7. To restore W2KS line to service after work

3.7.1. Prepare W2KS line for restoration

KS87 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 W2KS line

SCC shall advise W6 Operator to carry out the following:

- Check opened 6W2KS breaker
- Open 6W2KS-G ground disconnect switch
- Turn on 125Vdc supply and close 6W2KS-L2 disconnect switch

SCC shall advise KS87 Operator to carry out the following:

- Check opened 87L2A and 87L2T2 breakers
- Open 87W2KS-G ground disconnect switch
- Turn on 125Vdc supply and close 87L2A-L2 and 87L2T2-L2 disconnect switches

3.7.2. Restoration of W2KS line to service:

SCC shall:

- Advise the KS87 and W6 Operators of readiness to restore W2KS line to service
- Close (or advise the KS87 Operator to close) 87L2A and 87L2T2 breakers
- Close (or advise the W6 Operator to close) 6W2KS breaker

3.8. To restore W2KS line to service after automatic outage

If W2KS line trips auto due to fault:

KS87 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 KS87 Operator to energize) the line **ONCE** by closing breaker 87L2A and 87L2T2 breakers

- Close (or advise the W6 Operator to close) 6W2KS

KS87 Operator shall:

- 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 KS6M line out of service

SCC shall carry out (or advise the KS87 Operator to carry out) the following:

- Open 87L6A and 87L6T3 breakers

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

- Open 37L6A and 37L6L4 breakers

- Check for no potential on KS6M line

3.10. To take out, isolate and de-energize KS6M line for work

- KS87 Operator shall request for Station Guarantee from M37

SCC shall carry out (or advise the KS87 Operator to carry out) the following:

- Open 87L6A and 87L6T3 breakers

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

- Open 37L6A and 37L6T1 breakers

- Check for no potential on KS6M line

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

- Open 37L6A-L6 and 37L6T1-L6 disconnect switch and turn off its 125Vdc supply

- Close 37KS6M-G ground disconnect switch

SCC shall advise the KS87 Operator to carry out the following:

- Open 87L6A-L6 and 87L6T3-L6 disconnect switches and turn off 125Vdc supply

- Close 87KS6M-G ground disconnect switch

3.11. To restore KS6M line to service after work

3.11.1. Prepare KS6M line for restoration

KS87 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 KS6M line

SCC shall advise M37 Operator to carry out the following:

- Check opened 37L6A and 37L6T1 breaker

- Open 37KS6M-G ground disconnect switch

- Turn on 125Vdc supply and close 37L6A-L6 and 37L6T1-L6 disconnect switch

SCC shall advise KS87 Operator to carry out the following:

- Check opened 87L6A and 87L6T3 breakers

- Open 87KS6M-G ground disconnect switch

- Turn on 125Vdc supply and close 87L6A-L6 and 87L6T3-L6 disconnect switches

3.11.2. Restoration of KS6M line to service:

SCC shall:

- Advise the KS87 and M37 Operators of readiness to restore KS6M line to service

- Close (or advise the KS87 Operator to close) 87L6A and 87L6T3 breakers

- Close (or advise the M37 Operator to close) 37L6A and 37L6T1 breakers

3.12. To restore KS6M line to service after automatic outage

If KS6M line trips auto due to fault:

KS87 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 KS87 Operator to energize) the line **ONCE** by closing breaker 87L6A and 87L6T3 breakers

- Close (or advise the M37 Operator to close) 37L6A and 37L6T1

KS87 Operator shall:

- 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 take KS7M line out of service

SCC shall carry out (or advise the KS87 Operator to carry out) the following:

- Open 87L7A and 87L7T4 breakers

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

- Open 37L7A and 37L7L4 breakers
- Check for no potential on KS7M line

3.14. To take out, isolate and de-energize KS7M line for work

- KS87 Operator shall request for Station Guarantee from M37

SCC shall carry out (or advise the KS87 Operator to carry out) the following:

- Open 87L7A and 87L7T4 breakers

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

- Open 37L7A and 37L7L4 breakers
- Check for no potential on KS7M line

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

- Open 37L7A-L7 and 37L7L4-L7 disconnect switch and turn off its 125Vdc supply

- Close 37KS7M-G ground disconnect switch

SCC shall advise the KS87 Operator to carry out the following:

- Open 87L7A-L7 and 87L7T4-L7 disconnect switches and turn off 125Vdc supply

- Close 87KS7M-G ground disconnect switch

3.15. To restore KS7M line to service after work

3.15.1. Prepare KS7M line for restoration

KS87 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 KS7M line

SCC shall advise M37 Operator to carry out the following:

- Check opened 37L7A and 37L7L4 breaker

- Open 37KS7M-G ground disconnect switch

- Turn on 125Vdc supply and close 37L7A-L7 and 37L7L4-L7 disconnect switch

SCC shall advise KS87 Operator to carry out the following:

- Check opened 87L7A and 87L7T4 breakers

- Open 87KS7M-G ground disconnect switch

- Turn on 125Vdc supply and close 87L7A-L7 and 87L7T2-L7 disconnect switches

3.15.2. Restoration of KS7M line to service:

SCC shall:

- Advise the KS87 and M37 Operators of readiness to restore KS7M line to service

- Close (or advise the KS87 Operator to close) 87L7A and 87L7T4 breakers

- Close (or advise the M37 Operator to close) 37L7A and 37L7L4 breakers

3.16. To restore KS7M line to service after automatic outage

If KS7M line trips auto due to fault:

KS87 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 KS87 Operator to energize) the line **ONCE** by closing breaker 87L7A and 87L7T4 breakers

- Close (or advise the M37 Operator to close) 37L7A and 37L7L4

KS87 Operator shall:

- Advise the Supervisor/Area Manager of operation above

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

3.17. Isolate 87T1 Transformer for work

KS87 Operator shall request for Station Guarantee from customer on 87F1 and 87F2 Feeders

SCC shall advise KS87 operator to carry out the following:

- Inform customers about readiness to take off 87T1 bank

- Request customers on 87T1 Bank to take off their load

- Transfer Station Service from AC1 to AC2, if Station Service is on 87T1

- Open AC1 Contactor/MCB to take off supply to 87T1 transformer auxiliaries

SCC shall carry out (or advise KS87 operator to carry out) the following:

- Open 87T1F1 breaker

- Open 87T1F2 breaker

- Open 87L1T1 breaker

- Open 87DT1 breaker

- Check for no potential on 87T1 Bank

- Open 87DT1-T1 and 87L1T1-T1 disconnect switches and turn off 125Vdc supply

- Open 87T1F1-T1 and 87T1F2-T1 disconnect switches and turn off 125Vdc supply

- Open AC control MCB to 87T1 auxiliaries and tag

- Open 125V DC MCB to 87T1 primary and secondary protection and tag with PC13

3.18. To restore 87T1 Bank to service after work

3.18.1. Prepare 87T1 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 87T1 Bank and temporary grounds removed

- Check opened 87T1F1 and 87T1F2 breakers

- Check opened 87L1T1 and 87DT1

- Close 87T1F1-T1 and 87T1F2-T1 disconnect switches and turn off 125Vdc supply

- Close 87L1T1-T1 and 87DT1-T1 disconnect switches and turn off 125Vdc supply

- Close AC control MCB to 87T1 auxiliaries and remove tag

- Close 125V DC MCB to 87T1 primary and secondary protection and remove PC13 tag

- Advise SCC of readiness to restore 87T1 Bank to service

3.18.2. Restoration of 87T1 bank to service:

- SCC shall close (or advise KS87 Operator to close) 87L1T1 and 87DT1 breakers

- KS87 Operator shall advise Customer of readiness to restore 87T1 Bank to service

- SCC shall close (or advise KS87 Operator to close) the 87T1F1 and 87T1F2 feeder breakers

3.19. To restore 87T1 Bank to service after automatic outage

If 87T1 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 KS87 Operator to energize) the bank **ONCE** by closing 87L1T1 and 87DT1 breakers

KS87 Operator shall advise Customer of readiness to restore 87F1 and 87F2 feeders to service

SCC shall close (or advise KS87 Operator to close) 87T1F1 and 87T1F2 breakers

KS87 Operator shall:

- Advise the Supervisor/Area Manager and SCC of item above

- If not successful, isolate the Transformer for maintenance men to work on the equipment. (Refer to **4. Explanation**.)

3.20. Isolate 87T2 Transformer for work

KS87 Operator shall request for Station Guarantee from customer on 87F3 and 87F4 Feeders

SCC shall advise KS87 operator to carry out the following:

- Inform customers about readiness to take off 87T2 bank

- Request customers on 87T2 Bank to take off their load

- Transfer Station Service from AC2 to AC1, if Station Service is on 87T2

- Open AC2 Contactor/MCB to take off supply to 87T2 transformer auxiliaries

SCC shall carry out (or advise KS87 operator to carry out) the following:

- Open 87T2F3 breaker

- Open 87T2F4 breaker

- Open 87L2T2 breaker

- Open 87DT2 breaker

- Check for no potential on 87T2 Bank

- Open 87DT2-T2 and 87L2T2-T2 disconnect switches and turn off 125Vdc supply

- Open 87T2F3-T2 and 87T2F4-T2 disconnect switches and turn off 125Vdc supply

- Open AC control MCB to 87T2 auxiliaries and tag

- Open 125V DC MCB to 87T2 primary and secondary protection and tag with PC23

3.21. To restore 87T2 Bank to service after work

3.21.1. Prepare 87T2 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 87T2 Bank and temporary grounds removed

- Check opened 87T2F3 and 87T2F4 breakers

- Check opened 87L2T2 and 87DT2

- Close 87T2F3-T2 and 87T2F4-T2 disconnect switches and turn off 125Vdc supply

- Close 87L2T2-T2 and 87DT2-T2 disconnect switches and turn off 125Vdc supply

- Close AC control MCB to 87T2 auxiliaries and remove tag

- Close 125V DC MCB to 87T2 primary and secondary protection and remove PC23 tag

- Advise SCC of readiness to restore 87T2 Bank to service

3.21.2. Restoration of 87T2 bank to service:

- SCC shall close (or advise KS87 Operator to close) 87L2T2 and 87DT2 breakers

- KS87 Operator shall advise Customer of readiness to restore 87T2 Bank to service

- SCC shall close (or advise KS87 Operator to close) the 87T2F3 and 87T2F4 feeder breakers

3.22. To restore 87T2 Bank to service after automatic outage

If 87T2 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 KS87 Operator to energize) the bank **ONCE** by closing 87L2T2 and 87DT2 breakers

KS87 Operator shall advise Customer of readiness to restore 87F3 and 87F4 feeders to service

SCC shall close (or advise KS87 Operator to close) 87T2F2 and 87T2F2 breakers

KS87 Operator shall:

- Advise the Supervisor/Area Manager and SCC of item above

- If not successful, isolate the Transformer for maintenance men to work on the equipment. (Refer to **4. Explanation**.)

3.23. Isolate 87T3 Transformer for work

KS87 Operator shall request for Station Guarantee from customer on 87F5 and 87F6 Feeders

SCC shall advise KS87 operator to carry out the following:

- Inform customers about readiness to take off 87T3 bank

- Request customers on 87T3 Bank to take off their load

- Transfer Station Service from AC3 to AC1, if Station Service is on 87T3

- Open AC3 Contactor/MCB to take off supply to 87T3 transformer auxiliaries

SCC shall carry out (or advise KS87 operator to carry out) the following:

- Open 87T3F5 breaker

- Open 87T3F6 breaker

- Open 87L6T3 breaker

- Open 87DT3 breaker

- Check for no potential on 87T3 Bank

- Open 87DT3-T3 and 87L6T3-T3 disconnect switches and turn off 135Vdc supply

- Open 87T3F5-T3 and 87T3F6-T3 disconnect switches and turn off 135Vdc supply

- Open AC control MCB to 87T3 auxiliaries and tag

- Open 135V DC MCB to 87T3 primary and secondary protection and tag with PC33

3.24. To restore 87T3 Bank to service after work

3.24.1. Prepare 87T3 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 87T3 Bank and temporary grounds removed

- Check opened 87T3F5 and 87T3F6 breakers

- Check opened 87L6T3 and 87DT3

- Close 87T3F5-T3 and 87T3F6-T3 disconnect switches and turn off 125Vdc supply

- Close 87L6T3-T3 and 87DT3-T3 disconnect switches and turn off 125Vdc supply

- Close AC control MCB to 87T3 auxiliaries and remove tag

- Close 125V DC MCB to 87T3 primary and secondary protection and remove PC33 tag

- Advise SCC of readiness to restore 87T3 Bank to service

3.24.2. Restoration of 87T3 bank to service:

- SCC shall close (or advise KS87 Operator to close) 87L6T3 and 87DT3 breakers

- KS87 Operator shall advise Customer of readiness to restore 87T3 Bank to service

- SCC shall close (or advise KS87 Operator to close) the 87T3F5 and 87T3F6 feeder breakers

3.25. To restore 87T3 Bank to service after automatic outage

If 87T3 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 KS87 Operator to energize) the bank **ONCE** by closing 87L6T3 and 87DT3 breakers

KS87 Operator shall advise Customer of readiness to restore 87F5 and 87F6 feeders to service

SCC shall close (or advise KS87 Operator to close) 87T3F5 and 87T3F6 breakers

KS87 Operator shall:

- Advise the Supervisor/Area Manager and SCC of item above

- If not successful, isolate the Transformer for maintenance men to work on the equipment. (Refer to **4. Explanation**.)

3.26. Isolate 87T4 Transformer for work

SCC shall advise KS87 operator to carry out the following:

- Open 87SVCT4 breaker

- Open 87L7T4 breaker

- Open 87DT4 breaker

- Check for no potential on 87T4 Bank

- Open 87DT4-T4 and 87L7T4-T4 disconnect switches and turn off 125Vdc supply

- Open 87SVCT4-T4 disconnect switch and turn off 125Vdc supply

- Open AC control MCB to 87T4 auxiliaries and tag

- Open 125V DC MCB to 87T4 primary and secondary protection and tag with PC44

3.27. To restore 87T4 Bank to service after work

3.27.1. Prepare 87T4 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 87T4 Bank and temporary grounds removed

- Check opened 87SVCT4 breaker

- Check opened 87L7T4 and 87DT4

- Close 87SVCT4-T4 disconnect switch and turn off 125Vdc supply

- Close 87L7T4-T4 and 87DT4-T4 disconnect switches and turn off 125Vdc supply

- Close AC control MCB to 87T4 auxiliaries and remove tag

- Close 125V DC MCB to 87T4 primary and secondary protection and remove PC44 tag

- Advise SCC of readiness to restore 87T4 Bank to service

3.27.2. Restoration of 87T4 bank to service:

- SCC shall close (or advise KS87 Operator to close) 87L6T4 and 87DT4 breakers

- SCC shall close (or advise KS87 Operator to close) the 87SVCT4 breaker

3.28. To restore 87T4 Bank to service after automatic outage

If 87T4 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 KS87 Operator to energize) the bank **ONCE** by closing 87L6T4 and 87DT4 breakers

SCC shall close (or advise KS87 Operator to close) 87SVCT4 breaker

KS87 Operator shall:

- Advise the Supervisor/Area Manager and SCC of item above

- If not successful, isolate the Transformer for maintenance men to work on the equipment. (Refer to **4. Explanation**.)

3.29. Isolate 87SVCT4 Transformer for work

SCC shall advise KS87 operator to carry out the following:

- Open 87SVCT4 breaker

- Check for no potential on 87SVCT4 Bank

- Open 87SVCT4-SVC disconnect switch and turn off 125Vdc supply

3.30. To restore 87T4SVC Bank to service after work

3.30.1. Prepare 87T4SVC 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 87SVCT4 Bank and temporary grounds removed

- Check opened 87SVCT4 breaker

- Close 87SVCT4-T4 disconnect switch and turn off 125Vdc supply

- Advise SCC of readiness to restore 87SVCT4 Bank to service

3.30.2. Restoration of 87T4SVC bank to service:

- SCC shall close (or advise KS87 Operator to close) the 87T4SVC breaker

3.31. To restore 87T4SVC Bank to service after automatic outage

If 87T4SVC 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 close (or advise KS87 Operator to close) 87T4SVC breaker

KS87 Operator shall:

- Advise the Supervisor/Area Manager and SCC of item above

- If not successful, isolate the Transformer for maintenance men to work on the equipment. (Refer to **4. Explanation**.)

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

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- 86T can be reset manually immediately after an automatic outage if the station is attended.
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- 86G cannot be reset unless transformer gas and / or temperature conditions are normal or the MCB to the transformer protective relays is off.
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- NOTE:
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- 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.

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- 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.
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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 provide the normal points of supply to all circuits/equipment such as C1KS,W2KS, KS6M and KS7M line, 87T1, 87T2, 87T3 and 87T4 transformers and SVC Bank.

5. Approval

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Director, Technical Services