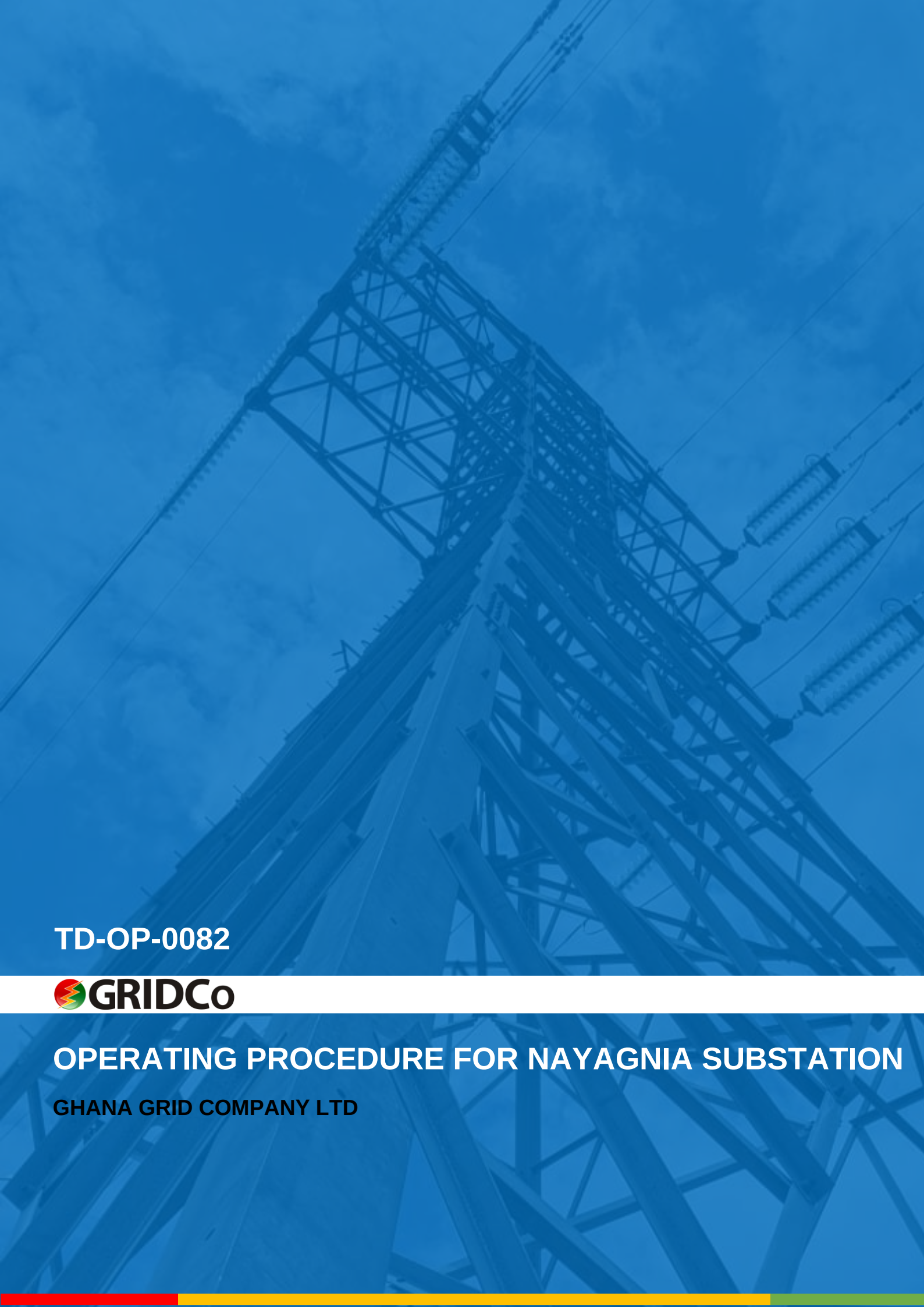

TD-OP-0082

GRIDCo

OPERATING PROCEDURE FOR NAYAGNIA SUBSTATION

GHANA GRID COMPANY LTD

Title:	**OPERATING PROCEDURE FOR NAYAGNIA SUBSTATION (NY82)**		
Issued To:	Director, System Operations Director, NNS Manager, SCC Manager, Dispatch Operations Area Manager, Bolga Operating Staff, Bolga Area Maintenance Staff, Bolga Area Dispatch Staff, SCC	**Number:**	TD-OP-0082
		Subject Area:	Operating
		Issue Date:	Trial
		Origin:	Technical Services
Key Words:	Take Out, Isolate, Prepare, Energize, Restore, Automatic Outage		

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 take BG4NY line out of service 5
3.5. To take out, isolate and de-energize BG4NY line for work 5
3.6. To restore BG4NY line to service after work 6
3.7. To take out, isolate and de-energize NY3TU line for work 8
3.8. To restore NY3TU line to service after work 8
3.9. To isolate 82T1 Bank for work 10
3.10. To restore 82T1 Bank to service after work 10
3.11. To restore 82T1 Bank to service after automatic outage 11
3.12. To isolate 82T2 Bank for work 12
3.13. To restore 82T2 Bank to service after work 13
3.14. To restore 82T2 Bank to service after automatic outage 14
3.15. Isolate 82R2 Shunt Reactor for work 14
3.16. To restore 82R2 Shunt Reactor to service after work 15
3.17. To restore 82R2 Shunt Reactor to service after automatic outage 15
3.18. To isolate 82T1Y1 breaker for work 16
3.19. To restore 82T1Y1 breaker to service after work 16
3.20. Isolate 82T2Y2 breaker for work 17
3.21. To restore 82T2Y2 breaker to service after work 17
3.22. To restore 82T2Y2 breaker to service after automatic outage ..... **Error! Bookmark not defined.**
4. Explanation 18
5. Approval 20

1. Purpose

This directive specifies the operations to be carried out to take out of service, isolate or restore equipment at NY82 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 NY82 Substation.

3. Procedure

3.1. To take BG1NY line out of service

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

- Open 82AL1 and 82DL1 breakers

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

- Open 29AL1 breaker
- Check for no potential on BG1NY line

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

- NY82 Operator request for Station Guarantee from BG29

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

- Open 82AL1and 82DL1 breakers

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

- Open 29AL1 breaker
- Check for no potential on BG1NY line

SCC shall advise BG1NY Operator to carry out the following:

- Verify opened 29L1-D transfer disconnect switch and turn off its 125Vdc supply
- Open 29AL1-L1 disconnect switch and turn off its 125Vdc supply
- Close 29BG1NY-G ground disconnect switch

SCC shall advise NY82 Operator to carry out the following:

- Open 82AL1-L1 and 82DL1-L1 disconnect switches and turn off 125Vdc supply
- Close 82BG1NY-G ground disconnect switch

3.3. To restore BG1NY line to service after work

3.3.1. Prepare BG1NY line for restoration:

NY82 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 BG29 Operator to carry out the following:

- Check opened 29L1-D transfer disconnect switch and turn on its 125Vdc supply
- Check opened 29AL1 breaker
- Open 29BG1NY-G ground disconnect switch
- Turn on 125Vdc supply and close 29AL1-L1 disconnect switch

SCC shall advise NY82 Operator to carry out the following:

- Check opened 82AL1and 82DL1 breakers
- Open 82BG1NY-G ground disconnect switch
- Turn on 125Vdc supply and close 82AL1-L1 and 82DL1-L1 disconnect switches

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) 29AL1 breaker
- Close (or advise the NY82 Operator to close) 82AL1 and 82DL1 breakers

To restore BG1NY line to service after automatic outage

If BG1NY line trips auto due to fault on the line:

NY82 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 line **ONCE** by closing 29AL1 breaker
- Close (or advise the NY82 Operator to close) 82AL1and 82DL1 breakers

NY82 Operator shall:

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

3.4. To take BG4NY line out of service

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

- Open 82AL4 and 82L4R2 breakers

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

- Open 29AL4 breaker
- Check for no potential on BG4NY line

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

- NY82 Operator request for Station Guarantee from BG29

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

- Open 82AL4 and 82L4R2 breakers

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

- Open 29AL4 breaker
- Check for no potential on BG4NY line

SCC shall advise NY82 Operator to carry out the following:

- Verify opened 29L4-D transfer disconnect switch and turn off its 125Vdc supply
- Open 29AL4–L4 disconnect switch and turn off its 125Vdc supply
- Close 29BG4NY-G ground disconnect switch

SCC shall advise NY82 Operator to carry out the following:

- Open 82AL4-L4 and 82L4R2-L4 disconnect switches and turn off 125Vdc supply
- Close 82BG4NY-G ground disconnect switch

3.6. To restore BG4NY line to service after work

3.6.1. Prepare BG4NY line for restoration:

NY82 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 BG29 Operator to carry out the following:

- Check opened 26L4-D transfer disconnect switch and turn off its 125Vdc supply
- Check opened 29AL4 breaker
- Open 29BG4NY-G ground disconnect switch
- Turn on 125Vdc supply and close 29AL4-L4 disconnect switch

SCC shall advise NY82 Operator to carry out the following:

- Check opened 82AL4 and 82L4R2 breakers
- Open 82BG4NY-G ground disconnect switch
- Turn on 125Vdc supply and close 82AL4-L4 and 82L4R2-L4 disconnect switches

3.6.2. Restoration of BG4NY line to service:

SCC shall:

- Advise the BG29 and NY82 Operators of readiness to restore BG4NY line to service
- Close (or advise the NY82 Operator to close) 82AL4 and 82L4R2 breakers
- Close (or advise the BG29 Operator to close) 29AL4 breaker

To restore BG4NY line to service after automatic outage

If BG4NY line trips auto due to fault on the line:

NY82 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 82AL4 and 82L4R2 breakers
- Close (or advise the BG29 Operator to close) 29AL4 breaker

NY82 Operator shall:

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

To take NY3TU line out of service

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

- Open 82AL3 and 82L3T2 breakers

SCC shall carry out (or advise the TU69 Operator to carry out) the following:

- Open 69AL3 and 69L1L3 breakers
- Check for no potential on NY3TU line

3.7. To take out, isolate and de-energize NY3TU line for work

- NY82 Operator request for Station Guarantee from TU69

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

- Open 82AL3 and 82L3T2 breakers

SCC shall carry out (or advise TU69 Operator to carry out) the following:

- Open 69AL3 and 69L1L3 breakers
- Check for no potential on NY3TU line

SCC shall advise TU69 Operator to carry out the following:

- Check open 69AL3 and 69L1L3 breakers
- Open 69AL3-L3 and 69L1L3-L3 disconnect switch and turn off its 125vdc supply
- Close 69NY3TU-G ground disconnect switch

SCC shall advise NY82 Operator to carry out the following:

- Open 82AL3-L3 and 82L3T2-L3 disconnect switches and turn off 125Vdc supply
- Close 82NY3TU-G ground disconnect switch

3.8. To restore NY3TU line to service after work

3.8.1. Prepare NY3TU line for restoration:

NY82 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 NY3TU line

SCC shall advise TU69 Operator to carry out the following:

- Check opened 69AL3 and 69L1L3 breakers
- Open 69NY3TU -G ground disconnect switch

- Turn on 125Vdc supply and close 69AL3-L3 and 69L1L3-L3 disconnect switch

SCC shall advise NY82 Operator to carry out the following:

- Check opened 82AL3 and 82L3T2 breakers
-
- Open 82NY3TU-G ground disconnect switch

- Turn on 125Vdc supply and close 82AL3-L3 and 82L3T2-L3 disconnect switches

3.8.2. Restoration of NY3TU line to service:

SCC shall:

- Advise the TU69 and NY82 Operators of readiness to restore NY3TU line to service

- Close (or advise the TU69 Operator to close) 69AL3 and 69L1L3 breakers

- Close (or advise the NY82 Operator to close) 82AL3 and 82L3T2 breakers

To restore NY3TU line to service after automatic outage

If NY3TU **line** trips auto due to fault on the line:

NY82 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 TU69 Operator to energize) the line **ONCE** by closing 69AL3 and 69L1L3 breakers

- Close (or advise the NY82 Operator to close) 82AL3 and 82L3T2 breakers

NY82 Operator shall:

- Advise the Supervisor/Area Manager of operation above

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

3.9. To isolate 82T1 Bank for work

SCC shall advise NY82 Operator to carry out the following:

- Inform customers about readiness to take off 82T1 bank
- Request customers on 82T1 Bank to take off their load
- Open AC1 Contactor/MCB to take off supply to 82T1 transformer auxiliaries
- If station service is on 82T1 transformer transfer supply by switching from AC1 toAC2

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

- Open 82T1Y1 breaker
- Open 82DT1 and 82AT1 breakers
- Open 82PT1 and 82L2T1 breakers
- Check for no potential on 82T1 Bank
- Open 82T1-Y1 disconnect switch and turn off its 125Vdc supply
- Open 82T1-P disconnect switch and turn off its 125Vdc supply
- Open 82T1-D disconnect switch and turn off its 125Vdc supply
- Close 82T1-G1 disconnect switch (330kV)
- Close 82T1-G2 disconnect switch (161kV)
- Open AC control MCB to 82T1 auxiliaries
- Open 125VDC MCB to 82T1 primary and secondary protection and tag with PC13

3.10. To restore 82T1 Bank to service after work

3.10.1. Prepare 82T1 bank for restoration:

NY82 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 82T1 Bank and temporary grounds removed
- Open 82T1-G1 disconnect switch
- Open 82T1-G2 disconnect switch
- Turn on 125Vdc supply and close 82T1-P disconnect switch
- Turn on 125Vdc supply and close 82T1-D disconnect switch
- Turn on 125Vdc supply and close 82T1-Y1 disconnect switch
- Close AC control MCB to 82T1 auxiliaries
- Close 125VDC MCB to 82T1 primary and secondary protection and tag with PC13
- Advise SCC of readiness to restore 82T1 Bank to service

3.10.2. Restoration of 82T1 bank to service:

- SCC shall close (or advise NY82 Operator to close) the 82DT1 and 82AT1 breakers
- SCC shall close (or advise NY82 Operator to close) the 82PT1 and 82L2T1 breakers
- NY82 Operator shall advise customers of readiness to restore 82Y1Bus to service
- SCC shall close (or advise NY82 Operator to close) the 82T1Y1 breaker

3.11. To restore 82T1 Bank to service after automatic outage

If 82T1 bank trips auto due to fault:

NY82 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 transformer ONCE by closing 82DT1 and 82AT1 breakers
- Energize (or advise the NY82 Operator to energize) the transformer ONCE by closing 82PT1 and 82L2T1breakers
- Advise customer of readiness to restore 82Y1 Bus to service
- Close 82T1Y1 breaker

NY82 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. See explanation.

3.12. To isolate 82T2 Bank for work

SCC shall advise NY82 Operator to carry out the following:

- Inform customers about readiness to take off 82T2 bank
- Request customers on 82T2 Bank to take off their load
- Open AC2 Contactor/MCB to take off supply to 82T2 transformer auxiliaries
- If station service is on 82T2 transfer supply to 82T1 by switching from AC2 to AC1, transformer

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

- Open 82T2Y2 breaker
- Open 82DT2 and 82L3T2 breakers
- Open 82PT2 and 82ET2 breakers
- Check for no potential on 82T2 Bank
- Open 82T2Y2-T2 disconnect switch and turn off its 125Vdc supply
- Open 82T2-D disconnect switch and turn off its 125Vdc supply
- Open 82T2-P disconnect switch and turn off its 125Vdc supply
- Close 82T2-G2 disconnect switch

- Close 82T2-G1 disconnect switch
- Open AC control MCB to 82T2 auxiliaries
- Open 125VDC MCB to 82T2 primary and secondary protection and tag with PC13

3.13. To restore 82T2 Bank to service after work

3.13.1. Prepare 82T2 bank for restoration:

NY82 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 82T2 Bank and temporary grounds removed
- Open 82T2-G1 disconnect switch
- Open 82T2-G2 disconnect switch
- Turn on 125Vdc supply and Close 82T2Y2-T2 disconnect switch
- Turn on 125Vdc supply and close 82T2-D disconnect switch
- Turn on 125Vdc supply and close 82T2-P disconnect switch
- Close AC control MCB to 82T2 auxiliaries
- Close 125VDC MCB to 82T2 primary and secondary protection and tag with PC13
- Advise SCC of readiness to restore 82T2 Bank to service

3.13.2. Restoration of 82T2 bank to service:

- SCC shall close (or advise NY82 Operator to close) the 82DT2 and 82L3T2 breakers
- SCC shall close (or advise NY82 Operator to close) the 82PT2 and 82ET2 breakers
- NY82 Operator shall advise customers of readiness to restore 82Y2 Bus to service
- SCC shall close (or advise NY82 Operator to close) the 82T2Y2 breaker

3.14. To restore 82T2 Bank to service after automatic outage

If 82T2 bank trips auto due to fault:

NY82 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 transformer ONCE by closing 82DT2 and 82L3T2 breakers
- Energize (or advise the NY82 Operator to energize) the transformer ONCE by closing 82PT2 and 82ET2 breakers
- Advise customer of readiness to restore 82Y2 Bus to service
- Close 82T2Y2 breaker

NY82 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. See explanation.

3.15. Isolate 82R2 Shunt Reactor for work

SCC shall advise NY82 Operator to carry out the following:

- Open AC1 Contactor/MCB to take off supply to 82R2 Shunt Reactor auxiliaries

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

- Open 82DR2 and 82L4R2 breakers
- Open 82R2-R2 disconnect switch
- Close 82R2-G disconnect switch
- Open AC control MCB to 82R2 auxiliaries

- Open 125V DC breaker to 82R2 primary and secondary protection and tag with PC13

- Check for no potential on 82R2 Reactor

3.16. To restore 82R2 Shunt Reactor to service after work

3.16.1. Prepare 82R2 Shunt Reactor for restoration:

NY82 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 82R2 Shunt Reactor and temporary grounds removed

- Open 82R2-G disconnect switch

- Close 82R2-R2 disconnect switch

- Close AC control MCB to 82R2 auxiliaries and remove tag

- Close 125V DC breaker to 82R2 primary and secondary protection and remove tag PC13

- Advise SCC of readiness to restore 82R2 Shunt Reactor to service

3.16.2. Restoration of 82R2 Shunt Reactor to service:

SCC shall close (or advise NY82 Operator to close) the 82DR2 and 82L4R2 breakers

3.17. To restore 82R2 Shunt Reactor to service after automatic outage

If 82R2 Shunt Reactor trips auto due to fault:

NY82 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 transformer **ONCE** by closing 82DR2 and 82L4R2

NY82 Operator shall:

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

- Isolate the Transformer for maintenance men to work on the equipment

3.18. To isolate 82T1Y1 breaker for work

SCC shall advise NY82 Operator to carry out the following:

- Inform customers about readiness to take off 82T1 bank
- Request customers on 82T1 Bank to take off their load
- If Station Service is on 82T1 transfer supply to 82T2 by switching from AC1 to AC2,
- Open AC1 Contactor/MCB to take off supply to 82T2 transformer auxiliaries

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

- Open 82T1Y1 breaker (34.5Kv)
- Open 82DT1 and 82AT1 breakers (161kV) breakers
- Open 82PT1 and 82L2T1 breakers (330kV) breakers
- Check for no potential on 82T1 Bank
- Open 82T1Y1-Y1 disconnect switch and turn off 125vdc supply (34.5kV)
- Open 82T1Y1-T1 disconnect switch and turn off 125vdc supply (34.5kV)

3.19. To restore 82T1Y1 breaker to service after work

3.19.1. Prepare 82T1Y1 breaker for restoration:

NY82 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 82T1 Bank and temporary grounds removed
- Turn on 125vdc supply and close 82T1Y1- YI disconnect switch and turn on 125vdc supply. (34.5kV)

- Turn on 125vdc supply and close 82T1Y1- T1 disconnect switch and turn on 125vdc supply. (34.5kV)

- Advise SCC and customer of readiness to restore 82T1 Bank to service

3.19.2. Restoration of 82T1Y1 breaker to service:

- SCC shall close (or advise NY82 Operator to close) the 82DT1 and 82AT1 breakers (161kV)

- SCC shall close (or advise NY82 Operator to close) the 82PT1 and 82L2T1 breakers (330kV) to tie to 161kV Bus

- SCC shall close (or advise NY82 Operator to close) 82T1Y1 breaker

3.20. Isolate 82T2Y2 breaker for work

SCC shall advise NY82 Operator to carry out the following:

- Inform customers about readiness to take off 82T2 bank

- Request customers on 82T2 Bank to take off their load

- if Station Service is on 82T2 transfer supply to 82T1 by switching from Station Service from AC2 to AC1,

- Open AC2 Contactor/MCB to take off supply to 82T2 transformer auxiliaries

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

- Open 82T2Y2 breaker (34.5kV)

- Open 82DT2 and 82L3T2 breakers (161kV) breakers

- Open 82PT2 and 82ET2 breakers (330kV) breakers

- Check for no potential on 82T2 Bank

- Open 82T2Y2-T2 disconnect switch and turn off 125vdc supply(34.5kV)

- Open 82T2Y2-Y2 disconnect switch and turn off 125vdc supply(34.5kV)

3.21. To restore 82T2Y2 breaker to service after work

3.21.1. Prepare 82T2Y2 breaker for restoration:

NY82 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 82T2Y2 breaker and temporary grounds removed

- Turn on 125vdc supply and close 82T2Y2-Y2 disconnect switch and turn on 125vdc supply(34.5kV)

- Turn on 125vdc supply and close 82T2Y2-T2 disconnect switch and turn on 125vdc supply(34.5kV)

- Advise SCC and customer of readiness to restore 82T2 Bank to service

3.21.2. Restoration of 82T2Y2 breaker to service:

SCC shall close (or advise NY82 Operator to close) the 82PT2 and 82ET2 breakers (330kV)

SCC shall close (or advise NY82 Operator to close) the 82DT2 and 82L3T2 breakers (161kV) to tie to 161kV Bus

NY82 Operator shall advise CUSTOMER of readiness to restore 82Y2 Bus to service

- SCC shall close (or advise NY82 Operator to close) 82T2Y2 breaker

4. Explanation

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

- Transformer differential lockout relay-86T

- Transformer Bucholtz relay or high temperature lockout relay-86G

- Transformer overcurrent back up relays

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

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

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

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

NOTE:

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

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

ISOLATION AND DE-ENERGIZING

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

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

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

4. Close the Grounding Switch.

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

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

ORDER TO OPERATE

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

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

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

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

The station has two 161kV buses. The main 'A' and 'D' buses have a breaker and half configuration which provides the normal points of supply to all circuits/equipment such as BG1NY, BG4NY, NY3TU, lines, 82T1, 82T2 Transformers and 82R2 Reactor.

The 82R2 Reactor in service allows the lines/Bus to be shunt compensated and

avoid voltage jumps occurring at the receiving end.

5. Approval

…….

Director, TSD