TD-OP-0047

GRIDCo

OPERATING PROCEDURE FOR CENIT SUBSTATION

GHANA GRID COMPANY LTD

Title:	**OPERATING PROCEDURE FOR CENIT SUBSTATION (TP47)**		
Issued To:	Director, System Operations Director, SNS Manager, SCC Manager, Dispatch Operations Area Manager, Cenit Operating Staff, Cenit Area Maintenance Staff, Cenit Area Dispatch Staff, SCC	**Number:**	TD-OP-0047
		Subject Area:	Operating
		Issue Date:	Trial
		Origin:	Technical Services
Key Words:	Take Out, Isolate, Prepare, Energize, Restore, Automatic Outage		

TECHNICAL DIRECTIVES

Contents

TECHNICAL DIRECTIVES

1. Purpose

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

2. Scope

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

3. Procedure

3.1. To take E2TP line out of service

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

- Open 47T2A and 47T2A breakers

SCC shall advise E4 Operator to carry out the following:

- Open 4A2-L2 disconnect switch and turn off its 125Vdc supply
- Check for no potential on E2TP line

3.2. To take out, isolate and de-energize E2TP line for work

- CENIT Operator shall request for Station Guarantee from E4

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

- Open 47T2A and 47T2A breakers

SCC shall carry out (or advise the E4 Operator to carry out) the following:

- Open 4A2-L2 breaker
- Check for no potential on E2TP line

SCC shall advise E4 Operator to carry out the following:

- Open 4A2-L2 disconnect switch and turn off its 125Vdc supply
- Close 4E2TP-G ground disconnect switch

SCC shall advise CENIT Operator to carry out the following:

- Open 47T2A-A and 47T2A-A disconnect switches and turn off its 125Vdc

supply

- Close 47E2TP-G ground disconnect switch

3.3. To restore E2TP line to service after work

3.3.1. Prepare E2TP line for restoration

CENIT 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 E2TP line

SCC shall advise E4 Operator to carry out the following

- Check opened 4A2-L2 breaker
- Open 4E2TP-G ground disconnect switch
- Turn on 125Vdc supply and close 4A2-L2 disconnect switch

SCC shall advise CENIT Operator to carry out the following:

- Check opened 47T2A and 47T2A breakers
- Open 47E2TP-G ground disconnect switch
- Turn on 125Vdc supply and close 47T2A-A and 47T2A-A disconnect switches

3.3.2. Restoration of E2TP line to service:

SCC shall:

- Advise the CENIT and E4 Operators of readiness to restore E2TP line to service
- Close (or advise the E4 Operator to close) 4A2-L2 breaker
- Close (or advise the CENIT Operator to close) 47T2A and 47T2A breakers

3.4. To restore E2TP line to service after automatic outage

If E2TP line trips auto due to fault:

E80 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:

- Close (or advise the CENIT Operator to close) 47T2A and 47T2A breakers

E80 Operator shall:

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

3.5. To isolate 47T1 Transformer for work

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

- Inform Customer about readiness to take off 47T1 Bank
- Open AC1 Contactor/MCB to take off supply to 47T1 transformer auxiliaries

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

- Open 47G1T1 and 47T2A breakers

CENIT Operator shall:

- Check for no potential on 47T1 Bank
- Open 47G1T1-T1 and 47T2A-T1 disconnect switches and turn off 125Vdc supply
- Open AC control MCB to 47T1 auxiliaries and tag
- Open 125Vdc MCB to 47T1 primary and secondary protection and tag with PC13

3.6. To restore 47T1 Bank to service

3.6.1. Prepare 47T1 Bank restoration:

CENIT Operation shall:

- Advise SCC when work on the bank has been completed and permit(s) surrendered (including all Station Guarantees)
- Check for no potential on 47T1 Bank and temporary grounds removed
- Turn on 125Vdc supply and close 47G1T1-T1 and 47T2A-T1 disconnect switches
- Close AC control MCB to 47T1 auxiliaries and remove tag
- Close 125Vdc MCB to 47T1 primary and secondary protection and remove PC13 tag
- Advise SCC and Customer of readiness to energize 47T1 bank

3.6.2. Restoration of 47T1 Bank:

- CENIT Operator shall advise Customer of readiness to restore 47T1 Transformer to service
- SCC shall close (or advise CENIT Operator to close) the 47G1T1 and 47T2A breakers

3.7. To restore 47T1 Bank to service after automatic outage

If 47T1 Bank trips auto due to fault:

CENIT 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 CENIT Operator to energize) the bank **ONCE** by closing 47G1T1 and 47T2A breakers

CENIT Operator shall:

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

3.8. To isolate 47T2 Transformer for work

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

- Inform Customers about readiness to take off 47T2 Bank
- Request Customer on 47T2 Bank to take off their load
- Open AC1 Contactor/MCB to take off supply to 47T2 transformer auxiliaries

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

- Open 47G2T2 and 47T2A breakers

CENIT Operator shall:

- Check for no potential on 47T2 Bank
- Open 47G2T2-T2 and 47T2A-T2 disconnect switches and turn off 125Vdc supply
- Open AC control MCB to 47T2 auxiliaries and tag
- Open 125Vdc MCB to 47T2 primary and secondary protection and tag with PC13

3.9. To restore 47T2 Bank to service

3.9.1. Prepare 47T2 Bank restoration:

CENIT Operation shall:

- Advise SCC when work on the bank has been completed and permit(s) surrendered (including all Station Guarantees)
- Check for no potential on 47T2 Bank and temporary grounds removed
- Turn on 125Vdc supply and close 47G2T2-T2 and 47T2A-T2 disconnect switches
- Close AC control MCB to 47T2 auxiliaries and remove tag
- Close 125Vdc MCB to 47T2 primary and secondary protection and remove PC13 tag
- Advise SCC and Customer of readiness to energize 47T2 bank

3.9.2. Restoration of 47T2 Bank:

- CENIT Operator shall advise Customer of readiness to restore 47T2 Transformer to service

- SCC shall close (or advise CENIT Operator to close) the 47G2T2 and 47T2A breakers

3.10. To restore 47T2 Bank to service after automatic outage

If 47T2 Bank trips auto due to fault:

CENIT Operator shall:

- Advise SCC about the outage

- Acknowledge all alarms and record relay operation details

- Reset relay targets

- Report relay operation details to SCC

CENIT Operator shall advise Customer of readiness to restore 47T2 Transformer to service

SCC shall energize (or advise the CENIT Operator to energize) the bank **ONCE** by closing 47G2T2 and 47T2A breakers

CENIT Operator shall:

- Advise the Supervisor/Manager of operation above

- Isolate the Transformer for maintenance men to work on the equipment if operation above is not successful. See 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 80kV 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 Generating station has a single 161kV buses. The main 'A', provides the normal points of supply to all circuits/equipment such as E2TP lines, 47T2 and 47T2 Transformers.

5. Approval

……

Director, Technical Services