TD-OP-0076

GRIDCo

OPERATING PROCEDURE FOR CENPOWER STATION

GHANA GRID COMPANY LTD

Title:	**OPERATING PROCEDURE FOR CENPOWER STATION (KC75)**		
Issued To:	Director, System Operations Director, SNS Manager, SCC Manager, Dispatch Operations Manager, Cenpower Operating Staff, Cenpower Maintenance Staff, Cenpower Dispatch Staff, SCC	**Number:**	TD-OP-0075
		Subject Area:	Operating
		Issue Date:	Trial
		Origin:	Technical Services
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 KC75 Substation to service for planned and auto outages.

2. Scope

The directive will be used by Operators at Cenpower and System Control Center (SCC) for operation of equipment at KC75 Substation.

3. Procedure

3.1. To take CP1KC line out of service

SCC shall carry out (or advise the CP76 Operator to carry out) the following:

- Open 76G1T1 breaker

SCC shall carry out (or advise the KC75 Operator to carry out) the following:

- Open 75L1D and 75L1L2 breakers
- Check for no potential on CP1KC line

3.2. To take out, isolate and de-energize CP1KC line for work

- CP76 Operator request for Station Guarantee from KC75

SCC shall carry out (or advise CP76 Operator to carry out) the following:

- Open 76G1T1 breaker
- CP76 Operator request for Station Guarantee from KC75

SCC shall carry out (or advise the KC75 Operator to carry out) the following:

- Open 75L1D and 75L1L2 breakers
- Check for no potential on CP1KC line

SCC shall advise KC75 Operator to carry out the following:

- Open 75L1D-L1 and 75L1L2-L1 disconnect switches and turn off its 125Vdc supply
- Close 75CP1KC-G ground disconnect switch

SCC shall advise CP76 Operator to carry out the following:

- Open 76T1-L1 disconnect switch and turn off its 125Vdc supply
- Close 76CP1KC-G ground disconnect switch

3.3. To restore CP1KC line to service after work

3.3.1. Prepare CP1KC line for restoration:

CP76 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 CP1KC line

SCC shall advise KC75 Operator to carry out the following:

- Check opened 75L1D and 75L1L2 breakers
- Open 75CP1KC-G ground disconnect switch
- Turn on 125Vdc supply and close 75L1D-L1 and 75L1L2-L1 disconnect switches

SCC shall advise CP76 Operator to carry out the following:

- Check opened 76G1T1 breaker
- Open 76CP1KC-G ground disconnect switch
- Turn on 125Vdc supply and close 76T1-L1 disconnect switch

3.3.2. Restoration of CP1KC line to service:

SCC shall:

- Advise the KC75 and CP76 Operators of readiness to restore CP1KC line to service
- Close (or advise the CP76 Operator to close) 76G1T1 breaker
- Close (or advise the KC75 Operator to close) 75L1D and 75L1L2 breakers

3.4. To restore CP1KC line to service after automatic outage

If CP1KC line trips auto due to fault on the line:

CP76 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 CP76 Operator to energize) the line **ONCE** by closing 76G1T1 breaker
- Close (or advise the KC75 Operator to close) 75L1D and 75L1L2 breakers

CP76 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 CP2KC line out of service

SCC shall carry out (or advise the CP76 Operator to carry out) the following:

- Open 76G2T2 breaker

SCC shall carry out (or advise the KC75 Operator to carry out) the following:

- Open 75L2D and 75L2L10 breakers
- Check for no potential on CP2KC line

3.6. To take out, isolate and de-energize CP2KC line for work

- CP76 Operator request for Station Guarantee from KC75

SCC shall carry out (or advise CP76 Operator to carry out) the following:

- Open 76G2T2 breaker

SCC shall carry out (or advise the KC75 Operator to carry out) the following:

- Open 75L2D and 75L2L10 breakers
- Check for no potential on CP2KC line

SCC shall advise KC75 Operator to carry out the following:

- Open 75L2D-L2 and 75L2L10-L2 disconnect switches and turn off its 125Vdc supply
- Close 75CP2KC-G ground disconnect switch

SCC shall advise CP76 Operator to carry out the following:

- Open 76T2-L2 disconnect switch and turn off its 125Vdc supply
- Close 76CP2KC-G ground disconnect switch

3.7. To restore CP2KC line to service after work

3.7.1. Prepare CP2KC line for restoration:

KC75 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 CP2KC line

SCC shall advise KC75 Operator to carry out the following:

- Check opened 75L2D and 75L2L10 breakers
- Open 75CP2KC-G ground disconnect switch
- Turn on 125Vdc supply and close 75L2D-L2 and 75L2L10-L2 disconnect switches

SCC shall advise CP76 Operator to carry out the following:

- Check opened 76G2T2 breaker
- Open 76CP2KC-G ground disconnect switch
- Turn on 125Vdc supply and close 76T2-L2 disconnect switch

3.7.2. Restoration of CP2KC line to service:

SCC shall:

- Advise the KC75 and CP76 Operators of readiness to restore CP2KC line to service

- Close (or advise the CP76 Operator to close) 76G2T2 breaker

- Close (or advise the KC75 Operator to close) 75L2D and 75L2L10 breakers

3.8. To restore CP2KC line to service after automatic outage

If CP2KC line trips auto due to fault on the line:

CP76 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 CP76 Operator to energize) the line **ONCE** by closing 76G2T2 breaker

- Close (or advise the KC75 Operator to close) 75L2D and 75L2L10 breakers

CP76 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 CP3KC line out of service

SCC shall carry out (or advise the CP76 Operator to carry out) the following:

- Open 76G3T3 breaker

SCC shall carry out (or advise the KC75 Operator to carry out) the following:

- Open 75L3D and 75T2T2 breakers

- Check for no potential on CP3KC line

3.10. To take out, isolate and de-energize CP3KC line for work

- CP76 Operator request for Station Guarantee from KC75

SCC shall carry out (or advise CP76 Operator to carry out) the following:

- Open 76G3T3 breaker

SCC shall carry out (or advise the KC75 Operator to carry out) the following:

- Open 75L3D and 75T2T2 breakers
- Check for no potential on CP3KC line

SCC shall advise KC75 Operator to carry out the following:

- Open 75L3D-L3 and 75T2T2-L3 disconnect switches and turn off its 125Vdc supply
- Close 75CP3KC-G ground disconnect switch
- SCC shall advise CP76 Operator to carry out the following:
- Open 76T3-L3 disconnect switch and turn off its 125Vdc supply
- Close 76CP3KC-G ground disconnect switch

3.11. To restore CP3KC line to service after work

3.11.1. Prepare CP3KC line for restoration:

KC75 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 CP3KC line

SCC shall advise KC75 Operator to carry out the following:

- Check opened 75L3D and 75T2T2 breakers
- Open 75CP3KC-G ground disconnect switch
- Turn on 125Vdc supply and close 75L3D-L3 and 75T2T2-L3 disconnect switches

SCC shall advise CP76 Operator to carry out the following:

- Check opened 76G3T3 breaker
- Open 76CP3KC-G ground disconnect switch

- Turn on 125Vdc supply and close 76T3-L3 disconnect switch

3.11.2. Restoration of CP3KC line to service:

SCC shall:

- Advise the KC75 and CP76 Operators of readiness to restore CP3KC line to service
- Close (or advise the CP76 Operator to close) 76G3T3 breaker
- Close (or advise the KC75 Operator to close) 75L3D and 75T2T2 breakers

3.12. To restore CP3KC line to service after automatic outage

If CP3KC line trips auto due to fault on the line:

CP76 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 CP76 Operator to energize) the line **ONCE** by closing 76G3T3 breaker
- Close (or advise the KC75 Operator to close) 75L3D and 75T2T2 breakers

CP76 Operator shall:

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

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 its 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 three generators and three Transformers

5. Approval

…….

Director, TSD