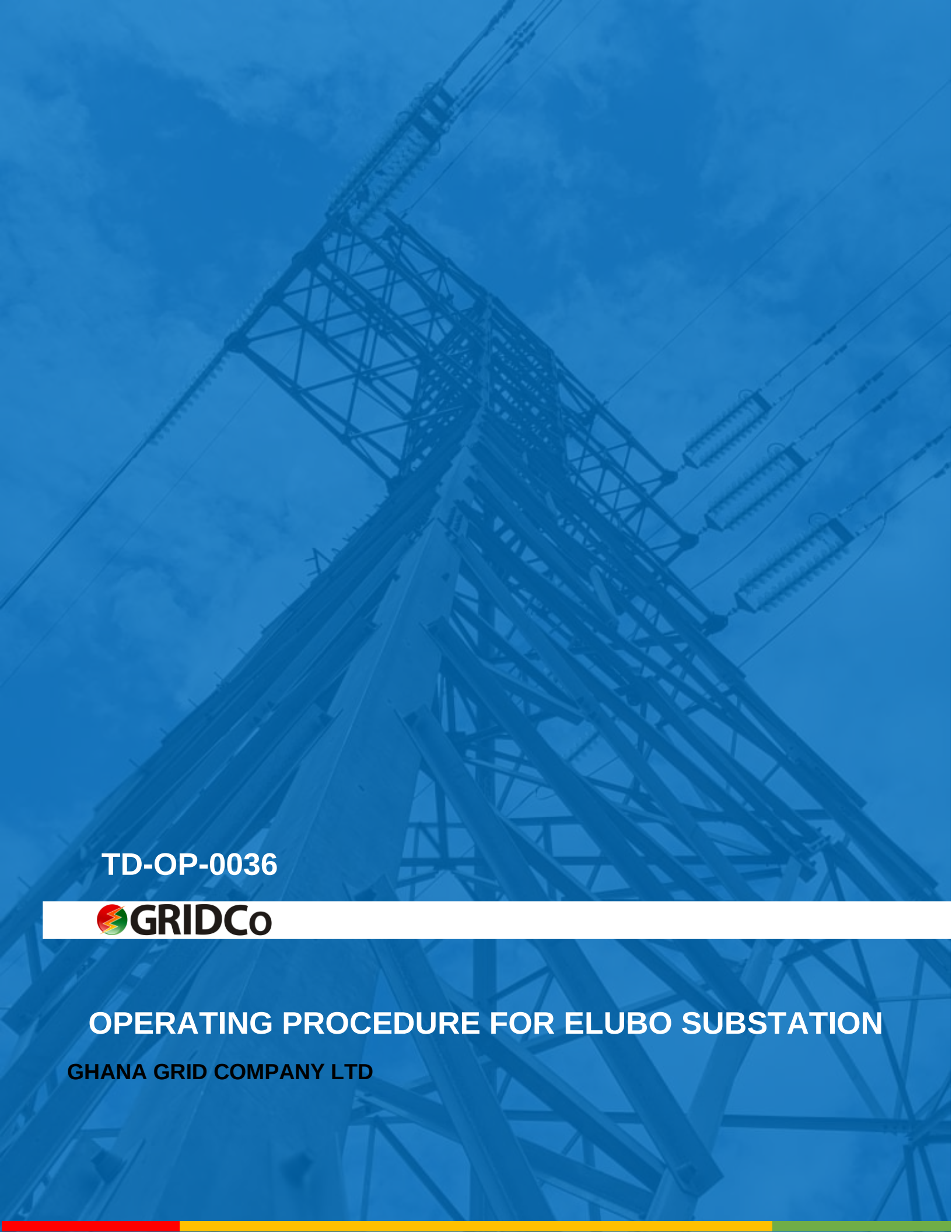

TD-OP-0036

GRIDCo

OPERATING PROCEDURE FOR ELUBO SUBSTATION

GHANA GRID COMPANY LTD

OPERATING PROCEDURE FOR ELUBO SUBSTATION (EL36)		
Director, System Operations Director, SNS Manager, SCC Manager, Dispatch Operations Area Manager, Takoradi Operating Staff, Takoradi Area Maintenance Staff, Takoradi Area Dispatch Staff, SCC	**Number:**	TD-OP-0036
	Subject Area:	Operating
	Issue Date:	Trial
	Origin:	Technical Services
Key Words: Take Out, Isolate, Prepare, Energize, Restore, Automatic Outage		

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TECHNICAL DIRECTIVES

1. Purpose

This directive specifies the operations to be carried out to take out of service, isolate or restore equipment at EL36 Substation to service for planned and auto outages.

2. Scope

The directive will be used by Operators at Takoradi Operating Area and System Control Center (SCC) for operation of equipment at EL36 Substation.

3. Procedure

3.1. To take EL1EA line out of service

SCC shall carry out (or advise the EL36 Operator to carry out) the following:

- Open 36L1T1 breaker

SCC shall carry out (or advise the EA34 Operator to carry out) the following:

- Open 34AT1 and 34L2D breakers
- Check for no potential on EL1EA line

3.2. To take out, isolate and de-energize EL1EA line for work

- EL36 Operator shall request for Station Guarantee from EA34

SCC shall carry out (or advise the EL36 Operator to carry out) the following:

- Open 36L1T1 breaker

SCC shall carry out (or advise the EA34 Operator to carry out) the following:

- Open 34AT1 and 34L2D breakers
- Check for no potential on EL1EA line

SCC shall advise the EL36 Operator to carry out the following:

- Open 36L1T1-L1 disconnect switch and turn off 125Vdc supply
- Close 36EL1EA-G ground disconnect switch

SCC shall advise the EA34 Operator to carry out the following:

- Open 34AT1-A and 34L2D-D disconnect switches and turn off 125Vdc

supply

- Close 34A-G and 34D-G ground disconnect switches

3.3. To restore EL1EA line to service after work

3.3.1. Prepare EL1EA line for restoration

EL36 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 EL1EA line

SCC shall advise EA34 Operator to carry out the following:

- Open 34A-G and 34D-G ground disconnect switches

- Turn on 125Vdc supply and close 34AT1-A and 34L2D-D disconnect switches

SCC shall advise EL36 Operator to carry out the following:

- Check opened 36L1T1 breaker

- Open 36EL1EA-G ground disconnect switch

- Turn on 125Vdc supply and close 36L1T1-L1 disconnect switch

3.3.2. Restoration of EL1EA line to service:

SCC shall:

- Advise the EL36 and EA34 Operators of readiness to restore EL1EA line to service

- Close (or advise EA34 operator to close) 34AT1 and 34L2D breakers

- Close (or advise EL36 operator to close) 36L1T1 breaker

3.4. To restore EL1EA line to service after automatic outage

If EL1EA 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 EL36 Operator to energize) the line **ONCE** by closing 36L1T1 breaker

- Close (or advise EA34 operator to close) 34AT1 and 34L2D breakers

EL36 Operator shall:

- Advise the Supervisor/Area Manager of operation above

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

3.5. To isolate 36T1 Transformer for work

SCC shall advise EL36 Operator to carry out the following:

- Transfer Station Service from 36T1 bank to the Standby Generator

- Open AC1 Contactor/MCB to take off supply to 36T1 transformer auxiliaries

SCC shall carry out or advise EL36 operator to carry out the following:

- Open 36L1T1, 36KT1 and 36HT1 breakers

- Check for no potential on 36T1 Bank

- Open 36L1T1-T1 disconnect switch and turn off its 125Vdc supply

- Open 36T1-KH disconnect switch and turn off its 125Vdc supply

- Open AC control MCB to 36T1 auxiliaries and tag

- Open 125V DC MCB to 36T1 primary and secondary protection and tag with PC13

3.6. To restore 36T1 Bank to service

3.6.1. Prepare 36T1 Bank for service after work

- Advise SCC when work on the transformer has been completed and permit(s) surrendered (including all Station Guarantees)

- Check for no potential on 36T1 Bank and temporary grounds removed

- Turn on 125Vdc supply and close 36L1T1-L1 disconnect switch
- Turn on 125Vdc supply and close 36T1-KH disconnect switch
- Close AC control MCB to 36T1 auxiliaries and remove tag
- Close 125V DC MCB to 36T1 primary and secondary protection and remove PC13 tag
- Advise SCC of readiness to restore 36T1 Bank to service

3.7. Restoration of 36T1 Bank to service:

- SCC shall close (or advise EL36 Operator to close) 36L1T1, 36KT1 and 36HT1 breakers

SCC shall advise EL36 Operator to carry out the following:

- Transfer Station Service from the Standby Generator to 36T1 bank
- Close AC1 Contactor/MCB to restore supply to 36T1 transformer auxiliaries

3.8. To restore 36T1 Bank to service after automatic outage

If 36T1 Bank trips auto due to fault:

EL36 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 EL36 Operator to energize) the bank ONCE by closing 36L1T1, 36KT1 and 36HT1 breakers

EL36 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

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 225kV buses. The main 'H' and 'K' buses, configuration provides the normal points of supply to all circuits/equipment such as EL1EA line, 36T1 transformer.

5. Approval

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Director, Technical Services