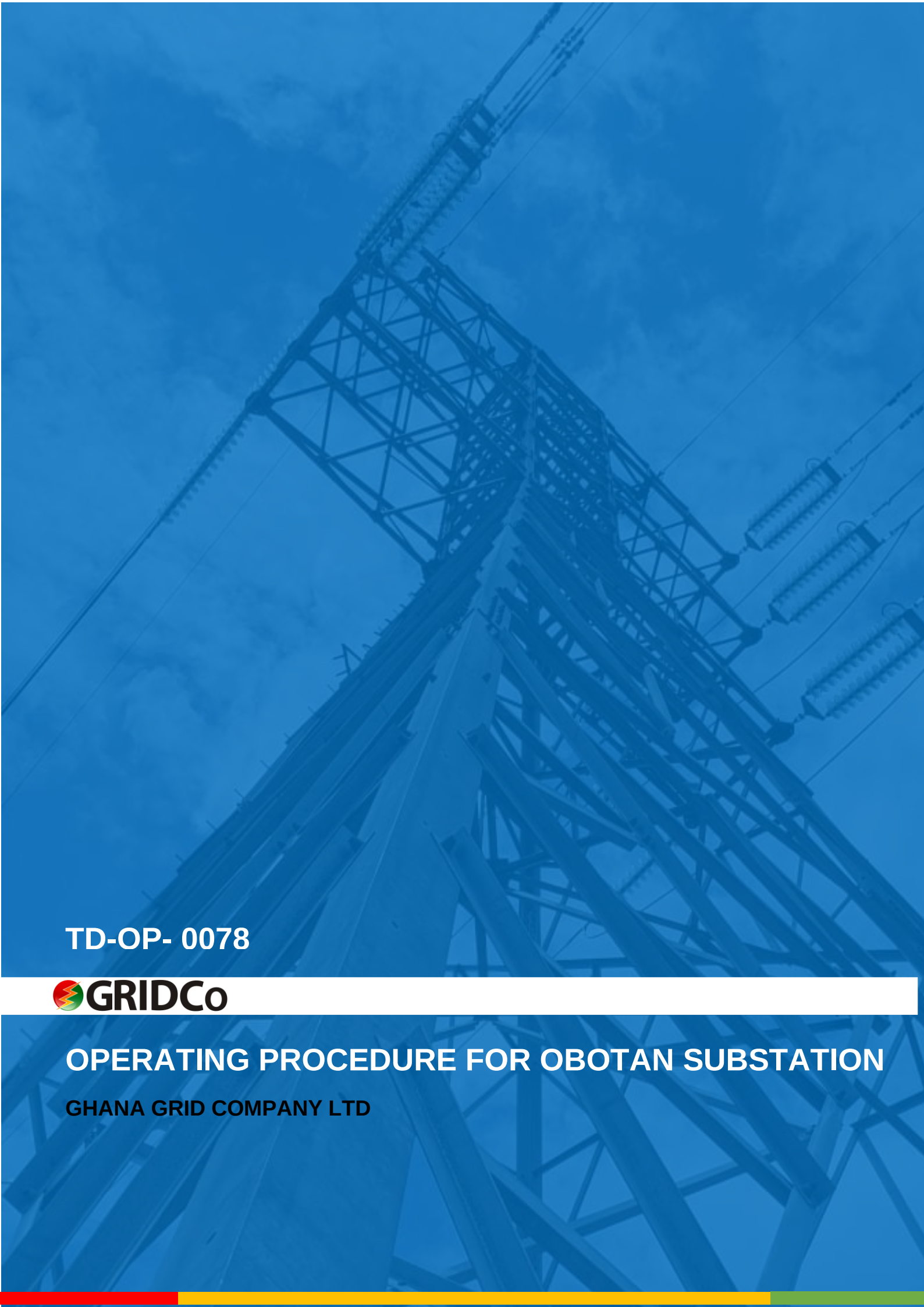

TD-OP- 0078

GRIDCo

OPERATING PROCEDURE FOR OBOTAN SUBSTATION

GHANA GRID COMPANY LTD

Title:	**OPERATING PROCEDURE FOR OBOTAN SUBSTATION (BT78)**		
Issued To:	Director, System Operations Director, NNS Manager, SCC Manager, Dispatch Operations Area Manager, Kumasi Operating Staff, Kumasi Area Maintenance Staff, Kumasi Area Dispatch Staff, SCC	**Number:**	TD-OP-0078
		Subject Area:	Operating
		Issue Date:	Trial
		Origin:	Technical Services
Key Words:	Take Out, Isolate, Prepare, Energize, Restore, Automatic Outage		

CONTENTS

TECHNICAL DIRECTIVES

1. Purpose

This directive specifies the operations to be carried out to take out of service, isolate or restore equipment at BT78 Substation to service for planned and auto outages.

2. Scope

The directive will be used by Operators at Kumasi Operating Area and System Control Center (SCC) for operation of equipment at BT78 Substation.

3. Procedure

3.1. To take AS3BT line out of service

SCC shall carry out (or advise the BT78 Operator to carry out) the following:

- Open 78T1F1 breaker
- Open 78AT1 breaker
- Open 78L3A breaker

SCC shall carry out (or advise the AS20 Operator to carry out) the following:

- Check opened 20AL3-S bypass disconnect switch
- Open 20AL3 breaker
- Check for no potential on AS3BT line

3.2. To take out, isolate and de-energize AS3BT line for work

- BT78 Operator shall request for Station Guarantee from AS20

SCC shall carry out (or advise the BT78 Operator to carry out) the following:

- Open 78T1F1 breaker
- Open 78AT1 breaker
- Open 78L3A breaker

SCC shall advise AS20 Operator to carry out the following:

- Check opened 20AL3-S bypass disconnect switch and turn off its 125Vdc supply

SCC shall carry out (or advise the AS20 Operator to carry out) the following:

- Open 20AL3 breaker

- Check for no potential on AS3BT line

SCC shall advise AS20 Operator to carry out the following:

- Open 20AL3-L3 disconnect switch and turn off its 125Vdc supply
- Close 20AS3BT-G ground disconnect switch

SCC shall advise BT78 Operator to carry out the following:

- Open 78L3A-L3 disconnect switch and turn off its 125Vdc supply
- Close 78AS3BT-G ground disconnect switch

3.3. To restore AS3BT line to service after work

3.3.1. Prepare AS3BT line for restoration:

BT78 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 AS3BT line

SCC shall advise AS20 Operator to carry out the following:

- Check all temporary grounds used been removed
- Check opened 20AL3-S bypass disconnect switch and turn on its 125Vdc supply
- Check opened 20AL3 breaker
- Open 20AS3BT-G ground disconnect switch
- Turn on 125Vdc supply and close 20AL3-L3 disconnect switch

SCC shall advise BT78 Operator to carry out the following:

- Check opened 78L3A breaker
- Open 78AS3BT-G ground disconnect switch
- Turn on 125Vdc supply and close 78L3A-L3 disconnect switch

3.3.2. Restoration of AS3BT line to service:

SCC shall:

- Advise the AS20 and BT78 Operators of readiness to restore AS3BT line to service

- Close (or advise the AS20 Operator to close) 20AL3 breaker
- Close (or advise the BT78 Operator to close) 78L3A breaker

3.4. To restore AS3BT line to service after automatic outage

If AS3BT line trips auto due to fault:

BT78 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 AS20 Operator to energize) the line **ONCE** by closing 20AL3 breaker
- Close (or advise the BT78 Operator to close) 78L3A breaker

BT78 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 78T1 Transformer for work

- BT78 Operator shall request Station Guarantee from Customer on 78F1 Feeder

SCC shall advise BT78 Operator to carry out the following:

- Inform Customer about readiness to take off 78T1 bank
- Request Customer on 78T1 Bank to take off their load
- Transfer Station Service from 78T1 bank to the Standby Generator
- Open AC1 Contactor/MCB to take off supply to 78T1 transformer auxiliaries

SCC shall carry out (or advise BT78 Operator to carry out) the following:

- Open 78T1F1 breaker

- Open 78AT1 breaker
- Check for no potential on 78T1 Bank
- Open 78AT1-A disconnect switch and turn off its125Vdc supply
- Open 78T1F1-F1 disconnect switch
- Open AC control MCB to 78T1 auxiliaries and tag
- Open 125V DC MCB to 78T1 primary and secondary protection and tag with PC13

3.6. To restore 78T1 Bank to service after work

3.6.1. Prepare 78T1 bank for restoration:

BT78 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 78T1 Bank and temporary grounds removed
- Close 78T1F1-F1 disconnect switch
- Turn on 125Vdc supply and close 78AT1-A disconnect switch
- Close AC control MCB to 78T1 auxiliaries and remove tag
- Close 125V DC MCB to 78T1 primary and secondary protection and remove PC13 tag
- Advise SCC of readiness to restore 78T1 Bank to service

3.6.2. Restoration of 78T1 bank to service:

- SCC shall close (or advise BT78 Operator to close) the 78AT1 breaker
- BT78 Operator shall advise Customer of readiness to restore 78F1 feeder to service
- SCC shall close (or advise BT78 Operator to close) the 78T1F1 breaker

3.7. To restore 78T1 Bank to service after automatic outage

If 78T1 bank trips auto due to fault:

BT78 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 BT78 Operator to energize) the bank ONCE by closing 78AT1 breaker

BT78 Operator shall advise Customer of readiness to restore 78F1 feeder to service

SCC shall close (or advise BG BT78 Operator to close) 78T1F1 breaker

BT78 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.

3.8. To isolate 78T1F1 Breaker for work

- BT78 Operator shall request Station Guarantee from Customer on 78F1 Feeder

SCC shall advise BT78 Operator to carry out the following:

- Inform Customer about readiness to take off 78T1 bank
- Request Customer on 78T1 Bank to take off their load
- Transfer Station Service from 78T1 to the Standby Generator
- Open AC1 Contactor/MCB to take off supply to 78T1 transformer auxiliaries

SCC shall carry out (or advise BT78 Operator to carry out) the following:

- Open 78T1F1 breaker
- Open 78AT1 breaker
- Open 78AT1-A disconnect switch and turn off its125Vdc supply
- Open 78T1F1-F1 disconnect switch and turn off its 125Vdc supply
- Check for no potential on 78T1 Bank

3.9. To restore 78T1F1 Breaker to service after work

3.9.1. Prepare 78T1F1 Breaker for restoration:

BT78 Operator shall:

- Advise SCC when work on the feeder breaker has been completed and permit(s) surrendered (including all Station Guarantees)
- Check for no potential on 78T1 Bank and temporary grounds removed
- Turn on 125Vdc supply and close 78T1F1-F1 disconnect switch
- Turn on 125Vdc supply and close 78AT1-A disconnect switch
- Advise SCC of readiness to restore 78T1F1 breaker to service

3.9.2. Restoration of 78T1F1 Breaker to service:

- SCC shall close (or advise BT78 Operator to close) the 78AT1 breaker
- BT78 Operator shall advise Customer of readiness to restore 78F1 feeder to service
- SCC shall close (or advise BT78 Operator to close) the 78T1F1 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 is only one 161Kv bus arrangement. The main 'A' bus provides the normal points of supply to the circuit/equipment such as AS3BT (Asawinso-Obotan) lines, 78T1 transformer.

5. Approval

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Director, Technical Services