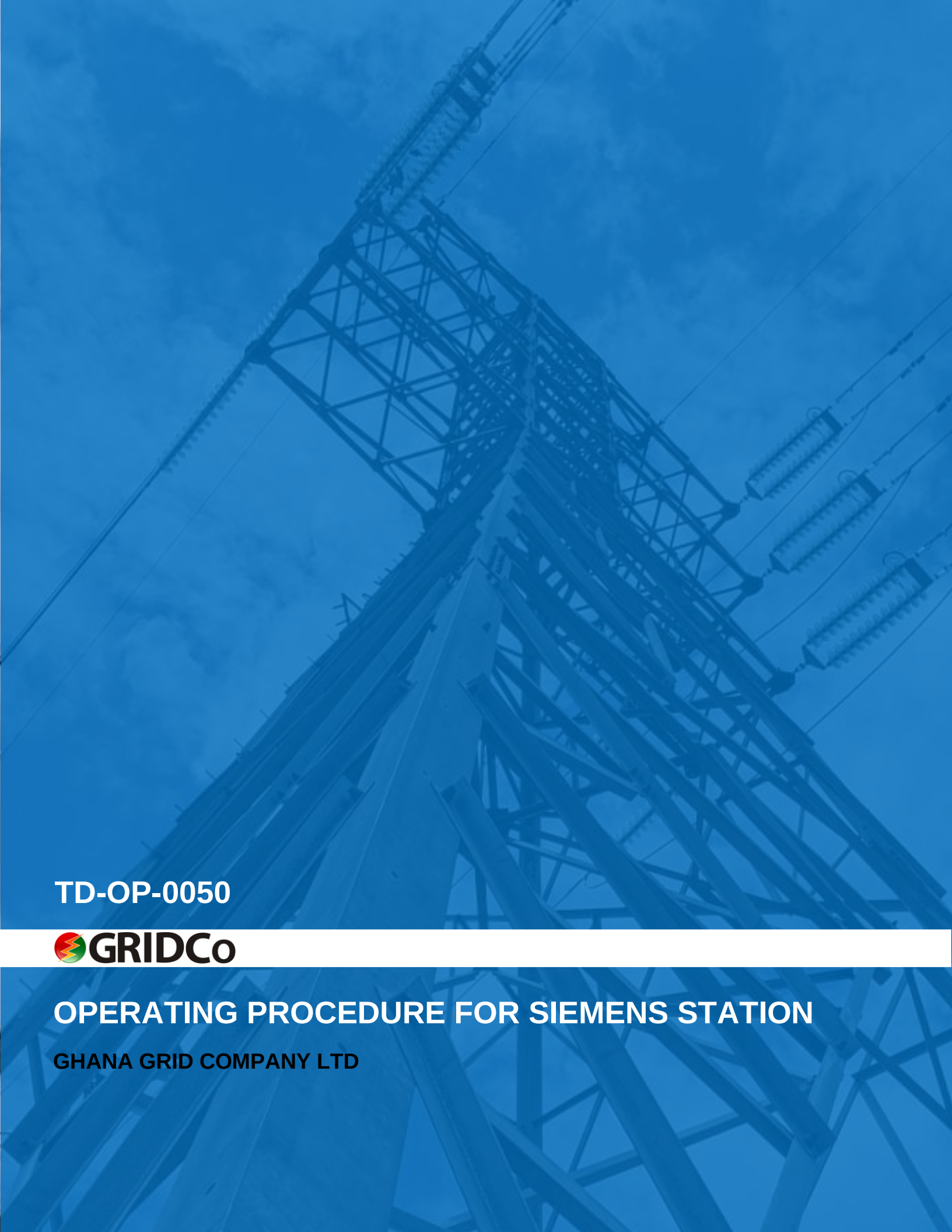

TD-OP-0050

GRIDCo

OPERATING PROCEDURE FOR SIEMENS STATION

GHANA GRID COMPANY LTD

TECHNICAL DIRECTIVES

Title:	**OPERATING PROCEDURE FOR SIEMENS (ST50)**		
Issued To:	Director, System Operations Director, SNS Manager, SCC Manager, Dispatch Operations Manager, Siemens Operating Staff, Siemens Maintenance Staff, Siemens Dispatch Staff, SCC	**Number:**	TD-OP-0050
		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 ST50 Substation to service for planned and auto outages.

2. Scope

The directive will be used by Operators at Siemens and System Control Center (SCC) for operation of equipment at ST50 Substation.

3. Procedure

3.1. Isolate 50B2T7 Breaker for work

ST50 Operator shall request Station Guarantee from Customer on 4T7 Transformer

SCC shall carry out (or advise ST50 operator to carry out) the following:

- Shut down 50G5, 50G6, 50G7 and 50G8 Generators
- Open 50B2T7 breaker
- Check for no potential on B2 Bus

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

- Open 4T7A2 breaker
- Check for no potential on 4T7 Bank

SCC shall advise E4 operator to carry out the following:

- Open 4T7A2-A2 disconnect switch and turn off 125Vdc supply
- Open 4B2-T7 disconnect switch and turn off 125Vdc supply
- Open AC control MCB to 4T7 auxiliaries
- Open 125Vdc MCB to 4T7 primary and secondary protection and tag with PC13

3.2. To restore 50B2T7 Breaker to service after work

3.2.1. Prepare 50B2T7 Breaker for restoration:

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

SCC shall carry out (or advise ST50 operator to carry out) the following:

- Start 50G5, 50G6, 50G7 and 50G8 Generators

3.2.2. Restoration of 50B2T7 Breaker to service:

- SCC shall close (or advise ST50 operator to close) 50B2T7 breaker
- ST50 Operator shall advise Customer of readiness to restore 4T7 Bank to service

3.3. Restore 50B2T7 Breaker to service after automatic outage

If 4T7 bank 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 ST50 Operator to energize) the breaker **ONCE** by closing 50B2T7 breaker

E4 Operator shall advise Customer of readiness to restore 50B2T7 Breakerto service

SCC shall close (or advise E4 Operator to close) 4T7A2 breaker

ST50 Operator shall:

- Advise the Supervisor/Area Manager of item above
- If not successful, isolate the Transformer for maintenance men to work on the equipment. See explanation.

3.4. Isolate 50B1T8 Breaker for work

ST50 Operator shall request Station Guarantee from Customer on 4T8 Transformer

SCC shall carry out (or advise ST50 operator to carry out) the following:

- Shut down 50G1, 50G2, 50G3 and 50G4 Generators
- Open 50B1T8 breaker
- Check for no potential on B2 Bus

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

- Open 4T8A2 breaker
- Check for no potential on 4T8 Bank

SCC shall advise E4 operator to carry out the following:

- Open 4T8A2-A2 disconnect switch and turn off 125Vdc supply
- Open 4B1-T8 disconnect switch and turn off 125Vdc supply

- Open AC control MCB to 4T8 auxiliaries
- Open 125Vdc MCB to 4T8 primary and secondary protection and tag with PC13

3.5. To restore 50B1T8 Breaker to service after work

3.5.1. Prepare 50B1T8 Breaker for restoration:

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

SCC shall carry out (or advise ST50 operator to carry out) the following:

- Start 50G1, 50G2, 50G3 and 50G4 Generators

3.5.2. Restoration of 50B1T8 Breaker to service:

- SCC shall close (or advise ST50 operator to close) 50B1T8 breaker
- ST50 Operator shall advise Customer of readiness to restore 4T8 Bank to service

3.6. Restore 50B1T8 Breaker to service after automatic outage

If 4T8 bank 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 ST50 Operator to energize) the breaker **ONCE** by closing 50B1T8 breaker

E4 Operator shall advise Customer of readiness to restore 4T8 Transformerto service

SCC shall close (or advise E4 Operator to close) 4T8A2 breaker

ST50 Operator shall:

- Advise the Supervisor/Manager of item above
- If not successful, isolate the Transformer for maintenance men to work on the equipment. 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 Generating station has two 11kV buses. The main 'B1' and 'B2' buses, two breaker configuration provides the normal points of supply to all circuits/equipment such as 4T7 and 4T8 transformers at E4 Station.

5. Approval

.....

Director, Technical Services