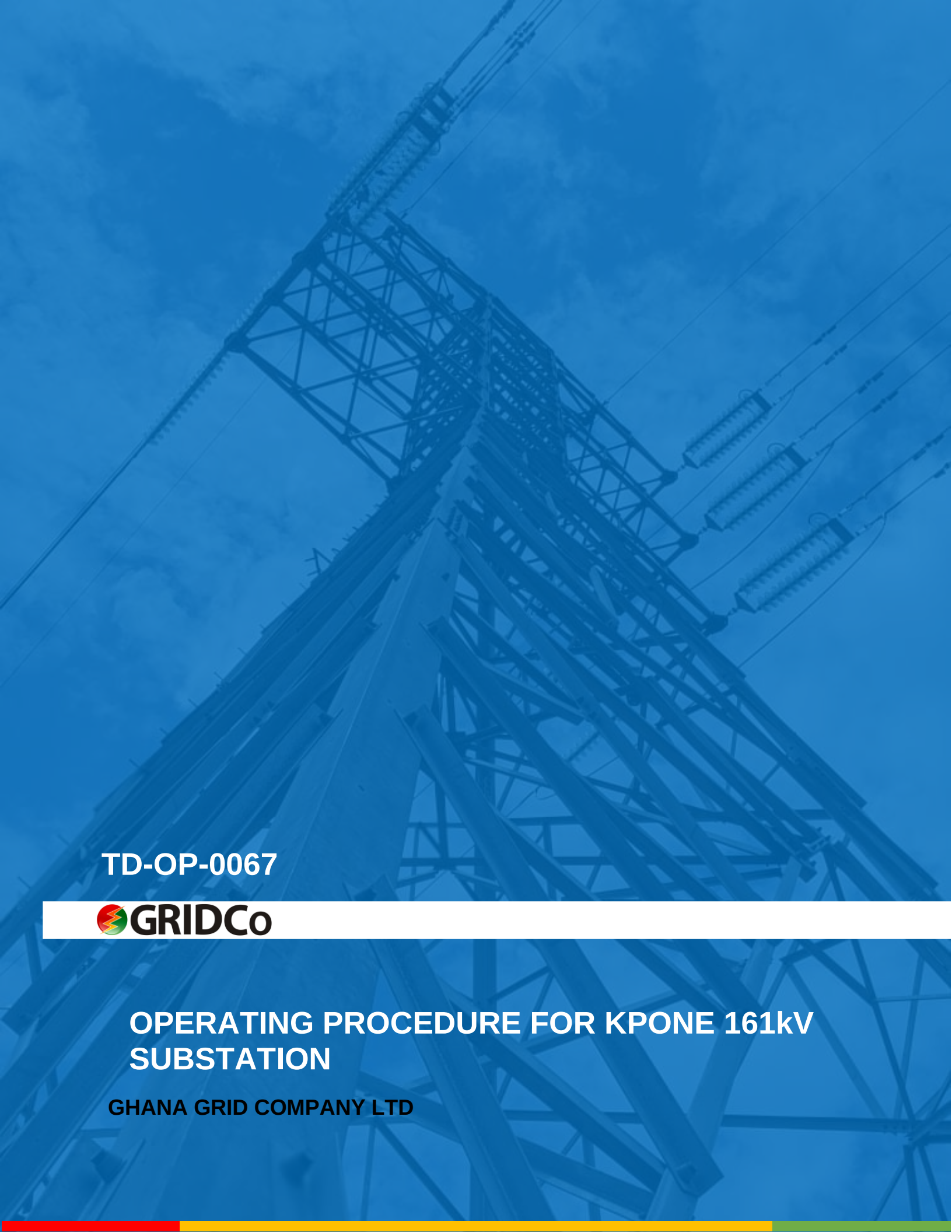

TD-OP-0067

GRIDCo

OPERATING PROCEDURE FOR KPONE 161kV SUBSTATION

GHANA GRID COMPANY LTD

Title:	**OPERATING PROCEDURE FOR KPONE 161kV SUBSTATION (KT67)**
Director, System Operations Director, SNS Manager, SCC Manager, Dispatch Operations Manager, Kpone Operating Staff, Kpone Area Maintenance Staff, Kpone Area Dispatch Staff, SCC	**Number:** TD-OP-0067 **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 KT67 Substation to service for planned and auto outages.

2. Scope

The directive will be used by Operators at Kpone and System Control Center (SCC) for operation of equipment at KT67 Substation.

3. Procedure

3.1. To take KT1V line out of service

SCC shall carry out (or advise the KT67 Operator to carry out) the following:

- Open 67T1L18 breaker

SCC shall carry out (or advise the V2 Operator to carry out) the following:

- Open 2L18A and 2L17L18 breakers
- Check for no potential on KT1V line

3.2. To take out, isolate and de-energize KT1V line for work

- KT67 Operator shall request for Station Guarantee from V2

SCC shall carry out (or advise the KT67 Operator to carry out) the following:

- Open 67T1L18 breaker

SCC shall carry out (or advise the V2 Operator to carry out) the following:

- Open 2L18A and 2L17L18 breakers
- Check for no potential on KT1V line

SCC shall advise the KT67 Operator to carry out the following:

- Open 67T1L18-L18 disconnect switch and turn off 125Vdc supply
- Close 67KT1V-G ground disconnect switch

SCC shall advise the V2 Operator to carry out the following:

- Open 2L18A-L18 and 2L17L18-L18 disconnect switches and turn off 125Vdc supply

- Close 2KT1V-G ground disconnect switch

3.3. To restore KT1V line to service after work

3.3.1. Prepare KT1V line for restoration

KT67 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 KT1V line

SCC shall advise V2 Operator to carry out the following:

- Open 2KT1V-G ground disconnect switch

- Turn on 125Vdc supply and close 2L18A-L18 and 2L17L18-L18 disconnect switches

SCC shall advise KT67 Operator to carry out the following:

- Check opened 67T1L18 breaker

- Open 77KT1V-G ground disconnect switch

- Turn on 125Vdc supply and close 67T1L18-L18 disconnect switch

3.3.2. Restoration of KT1V line to service:

SCC shall:

- Advise the KT67 and V2 Operators of readiness to restore KT1V line to service

- Close (or advise V2 operator to close) 2L18A and 2L17L18 breakers

- Close (or advise KT67 operator to close) 67T1L18 breaker

3.4. To restore KT1V line to service after automatic outage

If KT1V 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 KT67 Operator to energize) the line **ONCE** by closing 67T1L18 breaker
- Close (or advise V2 operator to close) 2L18A and 2L17L18 breakers

KT67 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 take KA11T line out of service

SCC shall carry out (or advise the KT67 Operator to carry out) the following:

- Open 77T5L11 breaker

SCC shall carry out (or advise the V2 Operator to carry out) the following:

- Open 32PL11 and 32L11L9 breakers
- Check for no potential on KA11T line

3.6. To take out, isolate and de-energize KA11T line for work

- KT67 Operator shall request for Station Guarantee from V2

SCC shall carry out (or advise the KT67 Operator to carry out) the following:

- Open 77T5L11 breaker

SCC shall carry out (or advise the V2 Operator to carry out) the following:

- Open 32PL11 and 32L11L9 breakers
- Check for no potential on KA11T line

SCC shall advise the KT67 Operator to carry out the following:

- Open 77T5L11-L11 disconnect switch and turn off 125Vdc supply

- Close 77KA11T-G ground disconnect switch

SCC shall advise the V2 Operator to carry out the following:

- Open 32PL11-L11 and 32L11L9-L11 disconnect switches and turn off 125Vdc supply

- Close 32KA11T-G ground disconnect switch

3.7. To restore KA11T line to service after work

3.7.1. Prepare KA11T line for restoration

KT67 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 KA11T line

SCC shall advise V2 Operator to carry out the following:

- Open 32KA11T-G ground disconnect switch

- Turn on 125Vdc supply and close 32PL11-L11 and 32L11L9-L11 disconnect switches

SCC shall advise KT67 Operator to carry out the following:

- Check opened 77T5L11 breaker

- Open 77KA11T-G ground disconnect switch

- Turn on 125Vdc supply and close 77T5L11-L11 disconnect switch

3.7.2. Restoration of KA11T line to service:

SCC shall:

- Advise the KT67 and V2 Operators of readiness to restore KA11T line to service

- Close (or advise V2 operator to close) 32PL11 and 32L11L9 breakers

- Close (or advise KT67 operator to close) 77T5L11 breaker

3.8. To restore KA11T line to service after automatic outage

If KA11T 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 KT67 Operator to energize) the line **ONCE** by closing 77T5L11 breaker
- Close (or advise V2 operator to close) 32PL11 and 32L11L9 breakers

KT67 Operator shall:

- Advise the Supervisor/Area Manager of operation above
- Advise maintenance men to patrol the line if the above operation 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 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 Generators with two transformers configuration

provides the normal points of supply to all circuits/equipment such as KT1V and KA11T lines.

5. Approval

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Director, Technical Services