

TD-OP-0085



OPERATING PROCEDURE FOR BRIDGE POWER PLANT SUBSTATION

GHANA GRID COMPANY LTD

TECHNICAL DIRECTIVES

Title: OPERATING PROCEDURE FOR BRIDGE POWER PLANT (BD85)		
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	Manager, SCC	
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1. Purpose

This directive specifies the operations to be carried out to take out of service, isolate or restore equipment at BD85 Power Plant to service for planned and auto outages.

2. Scope

The directive will be used by Operators at Accra Operating Area and System Control Center (SCC) for operation of equipment at BD85 Power Plant.

3. Procedure

3.1. To take BD11E line out of service

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

- Opened 4L11A2 breaker
- Check for no potential on BD11E line

SCC shall carry out (or advise the BD85 Operator to carry out) the following:

- Open 85T5L11 breaker
- Check for no potential on BD11E line

3.2. To take out, isolate and de-energize BD11E line for work

- BD85 Operator shall request for Station Guarantee from E4

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

- Opened 4L11A2 breaker
- Check for no potential on BD11E

SCC shall carry out (or advise the BD85 Operator to carry out) the following:

- Open 85T5L11 breaker
- Check for no potential on BD11E line

SCC shall advise the E4 Operator to carry out the following:

- Open 4L11A2–L11 disconnect switch and turn off 125Vdc supply
- Close 4BD11E-G ground disconnect switch

SCC shall advise the BD85 Operator to carry out the following:

- Open 85T5L11-L11 disconnect switch and turn off 125Vdc supply

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- Close 85BD11E-G ground disconnect switch

3.3. To restore BD11E line to service after work

3.3.1. Prepare BD11E line for restoration:

E4 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 BD11E line

SCC shall advise BD85 Operator to carry out the following:

- Check opened 85T5L11 breaker
- Open 85BD11E-G ground disconnect switch
- Turn on 125Vdc supply and close 85T5L11-L11 disconnect switch

SCC shall advise E4 Operator to carry out the following:

- Check opened 4L11A2 breaker
- Open 4BD11E-G disconnect switch
- Turn on 125Vdc supply and close 4L11A2-L11 disconnect switch

3.3.2. Restoration of BD11E line to service:

SCC shall:

- Advise the E4 and BD85 Operators of readiness to restore BD11E line to service
- Close (or advise BD85 Operator to close) 85T5L11 breaker
- Close (or advise E4 Operator to close) 4L11A2 breaker

3.4. To restore BD11E line to service after automatic outage

If BD11E line trips auto due to fault:

E4 Operator shall:

- Advise SCC about the outage
- Acknowledge all alarms and record relay operation details
- Reset relay targets

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- Report relay operation details to SCC

SCC shall:

- Energize (or advise the E4 Operator to energize) the line **ONCE** by closing 4L11A2 breaker
- Close (or advise the BD85 Operator to close) 85T5L11 breaker
- 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 BD12E line out of service

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

- Open 4L12A1 breaker
- Check for no potential on BD12E line

SCC shall carry out (or advise the BD85 Operator to carry out) the following:

- Open 85T6L12 breaker
- Check for no potential on BD12E line

3.6. To take out, isolate and de-energize BD12E line for work

- BD85 Operator shall request for Station Guarantee from E4

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

- Open 4L12A1 breaker
- Check for no potential on BD12E line

SCC shall carry out (or advise the BD85 Operator to carry out) the following:

- Open 85T6L12 breaker
- Check for no potential on BD12E line

SCC shall advise the BD85 Operator to carry out the following:

- Open 85T6L12-L12 disconnect switch and turn off 125Vdc supply
- Close 85BD12E-G ground disconnect switch

SCC shall advise the E4 Operator to carry out the following:

- Open 4L12A1-L12 disconnect switch and turn off its 125Vdc supply

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- Close 4BD12E-G ground disconnect switch

3.7. To restore BD12E line to service after work

3.7.1. Prepare BD12E line for restoration

E4 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 BD12E line

SCC shall advise BD85 Operator to carry out the following:

- Check opened 85T6L12 breaker
- Open 85BD12E-G ground disconnect switch
- Turn on 125Vdc supply and close 85T6L12-L12 disconnect switch

SCC shall advise E4 Operator to carry out the following:

- Check opened 4L12A1 breaker
- Open 4BD12E-G ground disconnect switch
- Turn on 125Vdc supply and close 4L12A1-L12 disconnect switch

3.7.2. Restoration of BD12E line to service:

SCC shall:

- Advise the E4 and BD85 Operators of readiness to restore BD12E line to service
- Close (or advise the BD85 Operator to close) BDT6L12 breaker
- Close (or advise the E4 Operator to close) 4L12A1 breaker

3.8. To restore BD12E line to service after automatic outage

If BD12E line trips auto due to fault:

E4 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 E4 Operator to energize) the line **ONCE** by closing

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4L12A1 breaker

- Close (or advise the BD85 Operator to close) 85T6L12 breaker

E4 Operator shall:

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

3.9. To isolate 85T5 Transformer for work

SCC shall advise BD85 Operator to carry out the following:

- Inform Customer about readiness to take off 85T5 bank
- Open AC5 Contactor/MCB to take off supply to 85T5 transformer auxiliaries

SCC shall carry out (or advise BD85 Operator to carry out) the following:

- Open 85Y1T5 breaker
- Open 85T5L11 breaker
- Check for no potential on 85T5 Bank
- Open 85T5L11-L11 disconnect switch and turn off its 125Vdc supply
- Open 85Y1T5-Y1 disconnect switch and turn off its 125Vdc supply
- Open AC control MCB to 85T5 auxiliaries and tag
- Open 125V DC MCB to 85T5 primary and secondary protection and tag with PC13

3.10. To restore 85T5 Bank to service after work

3.10.1. Prepare 85T5 Bank to service after work

BD85 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 85T5 Bank and temporary grounds removed
- Turn on 125Vdc supply and close 85Y1T5-Y1 disconnect switch
- Turn on 125Vdc supply and close 85T5L11-L11 disconnect switch
- Close AC control MCB to 85T5 auxiliaries and remove tag

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- Close 125V DC MCB to 85T5 primary and secondary protection and remove PC13 tag
- Advise SCC of readiness to restore 85T5 Bank to service

3.10.2. Restoration of 85T5 Bank to service:

- SCC shall close (or advise BD85 Operator to close) 85T5L11 breaker
- BD85 Operator shall advise Customer of readiness to restore 85T5 Bank to service
- SCC shall close (or advise BD85 Operator to close) 85Y1T5 breaker

3.11. To restore 85T5 Bank to service after automatic outage

If 85T5 Bank trips auto due to fault:

BD85 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 BD85 Operator to energize) the bank ONCE by closing 85T5L11 breaker

BD85 Operator shall advise Customer of readiness to restore 85T5 Bank to service

SCC shall close (or advise BD85 Operator to close) 85Y1T5 breaker

BD85 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.

3.12. To isolate 85T6 Transformer for work

SCC shall advise BD85 Operator to carry out the following:

- Inform Customer about readiness to take off 85T6 bank
- Open AC6 Contactor/MCB to take off supply to 85T6 transformer auxiliaries

SCC shall carry out (or advise BD85 Operator to carry out) the following:

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- Open 85Y3T6 breaker
- Open 85T6L12 breaker
- Check for no potential on 85T6 Bank
- Open 85T6L12-L12 disconnect switch and turn off its 125Vdc supply
- Open 85Y3T6-Y3 disconnect switch and turn off its 125Vdc supply
- Open AC control MCB to 85T6 auxiliaries and tag
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- Open 125V DC MCB to 85T6 primary and secondary protection and tag with PC13

3.13. To restore 85T6 Bank to service

3.13.1. Prepare 85T6 Bank to service after work

BD85 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 85T6 Bank and temporary grounds removed
- Turn on its 125Vdc supply and close 85Y3T6-Y3 disconnect switch
- Turn on its 125Vdc supply and close 85T6L12-L12 disconnect switch
- Advise SCC of readiness to restore 85T6 Bank to service

3.13.2. Restoration of 85T6 Bank to service:

- SCC shall close (or advise BD85 Operator to close) 85T6L12 breaker
- BD85 Operator shall advise Customer of readiness to restore 85T6 transformer to service
- SCC shall close (or advise BD85 Operator to close) 85Y3T6 breaker

3.14. To restore 85T6 Bank to service after automatic outage

If 85T6 Bank trips auto due to fault:

BD85 Operator shall:

- Advise SCC about the outage
- Acknowledge all alarms and record relay operation details

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- Reset relay targets
- Report relay operation details to SCC

SCC shall energize (or advise the BD85 Operator to energize) the bank ONCE by closing 85T6L12 breaker

BD85 Operator shall advise Customer of readiness to restore 85T6 Bank to service

SCC shall close (or advise BD85 Operator to close) 85Y3T6 breaker

BD85 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.

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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 station where the Protection Guarantee is to be issued and to System Control Centre.
6. Issue Work or Work and Test Permit to the workman.

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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 on a permanent ground switches a PC 14 to close the ground switch is not required.

The station has 161kV bus arrangement. The main 'Y' bus provides the normal points of connection to all circuits/equipment such as BD11E and BD12E (Bridge Power-New Tema) lines through two 34.5kV/161kV transformers.

5. Approval

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Director, Technical Services