

TD-OP-0034



OPERATING PROCEDURE FOR ESIAMA SUBSTATION

GHANA GRID COMPANY LTD

TECHNICAL DIRECTIVES

Title: OPERATING PROCEDURE FOR ESIAMA SUBSTATION (EA34)		
Issued To: 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-0034	
	Subject Area:	Operating
	Issue Date:	Trial
	Origin:	Technical Services
	Key Words: Take Out, Isolate, Prepare, Energize, Restore, Automatic Outage	

TECHNICAL DIRECTIVES

Contents

1. Purpose.....	3
2. Scope.....	3
3. Procedure.....	3
3.1. To take T2EA line out of service.....	3
3.2. To take out, isolate and de-energize T2EA line for work	3
3.3. To restore T2EA line to service after work.....	4
3.4. To restore T2EA line to service after automatic outage	4
3.5. To take EL1EA line out of service	5
3.6. To take out, isolate and de-energize EL1EA line for work	5
3.7. To restore EL1EA line to service after work	6
3.8. To restore EL1EA line to service after automatic outage	7
3.9. To isolate 34T1 Transformer for work	7
3.10. To restore 34T1 Bank to service.....	8
3.11. To restore 34T1 Bank to service after automatic outage	9
3.12. To isolate 34T1Y Breaker for work.....	9
3.13. To restore 34T1Y Breaker to service after work	10
4. Explanation.....	12
5. Approval.....	13

TECHNICAL DIRECTIVES

1. Purpose

This directive specifies the operations to be carried out to take out of service, isolate or restore equipment at EA34 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 EA34 Substation.

3. Procedure

3.1. To take T2EA line out of service

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

- Open 34L2D and 34L2T1 breakers

SCC shall advise T8 Operator to carry out the following:

- Open 8L2A and 8DL2 breakers
- Check for no potential on T2EA line

3.2. To take out, isolate and de-energize T2EA line for work

- EA34 Operator shall request for Station Guarantee from T8

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

- Open 34L2D and 34L2T1 breakers

SCC shall carry out (or advise the T8 Operator to carry out) the following:

- Open 8L2A and 8DL2 breakers
- Check for no potential on T2EA line

SCC shall advise T8 Operator to carry out the following:

- Open 8L2A-L2 and 8DL2-L2 disconnect switches and turn off its 125Vdc supply
- Close 8T2EA-G ground disconnect switch

SCC shall advise EA34 Operator to carry out the following:

TECHNICAL DIRECTIVES

- Open 34L2D-L2 and 34L2T1-L2 disconnect switches and turn off its 125Vdc supply
- Close 34T2EA-G ground disconnect switch

3.3. To restore T2EA line to service after work

3.3.1. Prepare T2EA line for restoration

EA34 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 T2EA line

SCC shall advise T8 Operator to carry out the following

- Check opened 8L2A and 8DL2 breakers
- Open 8T2EA-G ground disconnect switch
- Turn on 125Vdc supply and close 8L2A-L2 and 8DL2-L2 disconnect switches

SCC shall advise EA34 Operator to carry out the following:

- Check opened 34L2D and 34L2T1 breakers
- Open 34T2EA-G ground disconnect switch
- Turn on 125Vdc supply and close 34L2D-L2 and 34L2T1-L2 disconnect switches

3.3.2. Restoration of T2EA line to service:

SCC shall:

- Advise the EA34 and T8 Operators of readiness to restore T2EA line to service
- Close (or advise the T8 Operator to close) 8L2A and 8DL2 breakers
- Close (or advise the EA34 Operator to close) 34L2D and 34L2T1 breakers

3.4. To restore T2EA line to service after automatic outage

TECHNICAL DIRECTIVES

If T2EA line trips auto due to fault:

E34 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 T8 Operator to energize) the line **ONCE** by closing 8AL2 and 8DL2 breakers
- Close (or advise the EA34 Operator to close) 34L2D and 34L2T1 breakers

E34 Operator shall:

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

3.5. To take EL1EA line out of service

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

- Open 34L2D and 34AT1 breakers

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

- Open 36L1T1 breaker
- Check for no potential on EL1EA line

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

- EA34 Operator shall request for Station Guarantee from EL36

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

- Open 34L2D and 34AT1 breakers

SCC shall advise EL36 Operator to carry out the following:

TECHNICAL DIRECTIVES

- Open 36L1T1 breaker
- Check for no potential on EL1EA line

SCC shall advise EA34 Operator to carry out the following:

- Open 34L2D-D and 34AT1-A disconnect switches and turn off its 125Vdc supply
- Close 34EL1EA-G ground disconnect switch

SCC shall advise EL36 Operator to carry out the following:

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

3.7. To restore EL1EA line to service after work

3.7.1. Prepare EL1EA line for restoration

EA34 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

- Check opened 34L2D and 34AT1 breakers
- Open 34EL1EA-G ground disconnect switch
- Turn on 125Vdc supply and close 34L2D-D and 34AT1-A 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

3.7.2. Restoration of EL1EA line to service:

SCC shall:

TECHNICAL DIRECTIVES

- Advise the EA34 and EL36 Operators of readiness to restore EL1EA line to service
- Close (or advise the EA34 Operator to close) 34L2D and 34AT1 breakers
- Close (or advise the EL36 Operator to close) 36L1T1 breaker

3.8. To restore EL1EA line to service after automatic outage

If EL1EA line trips auto due to fault:

EA34 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 EA34 Operator to energize) the line **ONCE** by closing 34L2D and 34AT1 breakers
- Close (or advise the EL36 Operator to close) 36L1T1 breaker

EA34 Operator shall:

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

3.9. To isolate 34T1 Transformer for work

- EA34 Operator shall request for Station Guarantee from Customers on 34Y Bus

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

- Inform Customers about readiness to take off 34T1 Bank
- Request Customers on 34T1 Bank to take off their load
- Transfer Station Service supply from 34TSS1 to Standby generator

TECHNICAL DIRECTIVES

- Open AC1 Contactor/MCB to take off supply to 34T1 transformer auxiliaries

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

- Open 34YF1 and 34YF2 breakers
- Open 34L2T1 and 34AT1 breakers

EA34 Operator shall:

- Check for no potential on 34T1 Bank
- Open 34L2T1-T1 and 34AT1-T1 disconnect switches and turn off 125Vdc supply
- Open 34T1Y-T1 disconnect switch
- Open AC control MCB to 34T1 auxiliaries and tag
- Open 125Vdc MCB to 34T1 primary and secondary protection and tag with PC13

3.10. To restore 34T1 Bank to service

3.10.1. Prepare 34T1 Bank restoration:

EA34 Operation shall:

- Advise SCC when work on the bank has been completed and permit(s) surrendered (including all Station Guarantees)
- Check for no potential on 34T1 Bank and temporary grounds removed
- Turn on 125Vdc supply and close 34L2T1-T1 and 34AT1-T1 disconnect switches
- Close 34T1Y-T1 disconnect switch
- Close AC control MCB to 34T1 auxiliaries and remove tag
- Close 125Vdc MCB to 34T1 primary and secondary protection and remove PC13 tag
- Advise SCC and Customers of readiness to energize 34T1 bank

3.10.2. Restoration of 34T1 Bank:

- SCC shall close (or advise EA34 Operator to close) the 34L2T1 and 34AT1 breakers
- Transfer Station Service supply from Standby generator to 34TSS1

TECHNICAL DIRECTIVES

- EA34 Operator shall advise Customers of readiness to restore 34F1 and 34F2 feeders to service
- SCC shall close (or advise EA34 Operator to close) 34YF1 and 34YF2 breakers

3.11. To restore 34T1 Bank to service after automatic outage

If 34T1 Bank trips auto due to fault:

EA34 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 EA34 Operator to energize) the bank **ONCE** by closing 34L2T1 and 34AT1 breakers

EA34 Operator shall advise Customers of readiness to restore 34F1 and 34F2 feeders to service

SCC shall close (or advise EA34 Operator to close) 34YF1 and 34YF2 breakers

EA34 Operator shall:

- Advise the Supervisor/Area Manager 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 34T1Y Breaker for work

- EA34 Operator shall request for Station Guarantee from Customer on 34F1 and 34F2 feeders

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

- Open 34YF1 and 34YF2 breakers
- Open 34T1Y breaker

SCC shall advise EA34 Operator to carry out the following:

- Open 34T1Y-T1 disconnect switch

TECHNICAL DIRECTIVES

- Open 34YF1-Y and 34YF2-Y disconnect switches and turn off its 125Vdc supply

3.13. To restore 34T1Y Breaker to service

3.13.1. Prepare 34T1Y Breaker restoration:

EA34 Operation shall:

- Advise SCC when work on the breaker has been completed and permit(s) surrendered (including all Station Guarantees)
- Check 34T1Y Breaker in the opened position and temporary grounds removed
- Close 34YF1-Y and 34YF2-Y disconnect switches
- Close 34T1Y-T1 disconnect switch

3.13.2. Restoration of 34T1Y Breaker:

- SCC shall close (or advise EA34 Operator to close) the 34T1Y breaker
- EA34 Operator shall advise Customers of readiness to restore 34F1 and 34F2 feeders to service
- SCC shall close (or advise EA34 Operator to close) 34YF1 and 34YF2 breakers

3.14. To isolate 34YF1 Breaker for work with no supply to customer

- EA34 Operator shall inform Customer about readiness to take off 34F1 feeder
- SCC shall open (or advise EA34 Operator to open) 34YF1 breaker

SCC shall advise EA34 Operator to carry out the following:

- Open 34YF1-Y and 34YF1-F1 disconnect switches
- Check opened 34YF1-S bypass disconnect switch

3.15. To restore 34YF1 Breaker to service after work

3.15.1. To prepare 34YF1 Breaker for service after work

EA34 Operator shall:

- Advise SCC when work on the 34YF1 breaker has been completed and

TECHNICAL DIRECTIVES

permit(s) surrendered (including all Station Guarantees)

- Check for no potential on 34F1 feeder and temporary grounds removed
- Close 34YF1-Y and 34YF1-F1 disconnect switches
- Check opened 34YF1-S bypass disconnect switch

3.15.2. Restoration of 34YF1 breaker to service:

- EA34 Operator shall advise Customer of readiness to restore 34F1 Feeder to service
- SCC shall close (or advise EA34 Operator to close) the 34YF1 breaker

3.16. To isolate 34YF2 Breaker for work with no supply to customer

- EA34 Operator shall inform Customer about readiness to take off 34F2 feeder
- SCC shall open (or advise EA34 Operator to open) 34YF2 breaker

SCC shall advise EA34 Operator to carry out the following:

- Open 34YF2-Y and 34YF2-F2 disconnect switches
- Check opened 34YF2-S bypass disconnect switch

3.17. To restore 34YF2 Breaker to service after work

3.17.1. To prepare 34YF2 Breaker for service after work

EA34 Operator shall:

- Advise SCC when work on the 34YF2 breaker has been completed and permit(s) surrendered (including all Station Guarantees)
- Check for no potential on 34F2 feeder and temporary grounds removed
- Close 34YF2-Y and 34YF2-F2 disconnect switches
- Check opened 34YF2-S bypass disconnect switch

3.17.2. Restoration of 34YF2 breaker to service:

- EA34 Operator shall advise Customer of readiness to restore 34F2 Feeder to service
- SCC shall close (or advise EA34 Operator to close) 34YF2 breaker

TECHNICAL DIRECTIVES

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.

TECHNICAL DIRECTIVES

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 161kV buses. The main 'A' and 'D' buses, a breaker and half configuration provide the normal points of supply to all circuits/equipment such as EL1EA, T2EA lines, 34T1 Transformer.

5. Approval

.....

Director, Technical Services