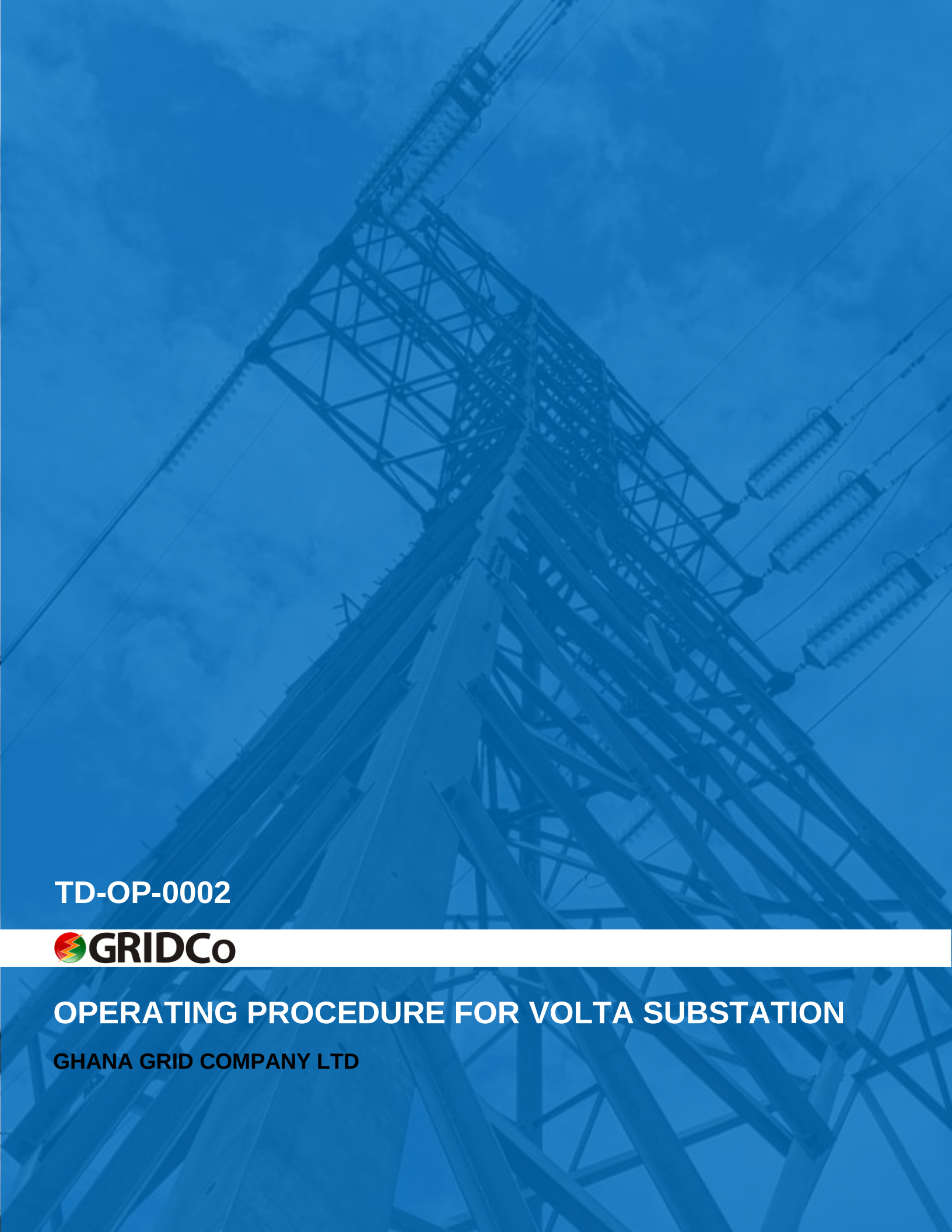

TD-OP-0002

GRIDCo

OPERATING PROCEDURE FOR VOLTA SUBSTATION

GHANA GRID COMPANY LTD

TECHNICAL DIRECTIVES

Title:	**OPERATING PROCEDURE FOR VOLTA SUBSTATION (V2)**		
Issued To:	Director, System Operations Director, SNS Manager, SCC Manager, Dispatch Operations Area Manager, Tema Operating Staff, Tema Area Maintenance Staff, Tema Area Dispatch Staff, SCC	**Number:**	TD-OP-0002
		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 V2 Substation to service for planned and auto outages.

2. Scope

The directive will be used by Operators at Tema Operating Area and System Control Center (SCC) for operation of equipment at V2.

3. Procedure

1.0. To take V24H line out of service

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

- Open 2L24A and 2L24L9 breakers

SCC shall carry out (or advise the H5 Operator to carry out) the following:

- Open 5L24A and 5L24T2 breakers

- Check for no potential on V24H line

1.1. To take out, isolate and de-energize V24H line for work

- V2 Operator shall request for Station Guarantee from H5

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

- Open 2L24A and 2L24L9 breakers

SCC shall carry out (or advise the H5 Operator to carry out) the following:

- Open 5L24A and 5L24T2 breakers

- Check for no potential on V24H line

SCC shall advise H5 Operator to carry out the following:

- Open 5L24A-L24 and 5L24T2-L24 disconnect switches and turn off its 125Vdc supply

- Close 5V24H-G ground disconnect switch

SCC shall advise V2 Operator to carry out the following:

- Open 2L24A-L24 and 2L24L9-L24 disconnect switches and turn off its 125Vdc supply
- Close 2V24H-G ground disconnect switch

1.2. To restore V24H line to service after work

1.2.1. Prepare V24H line for restoration

V2 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 V24H line

SCC shall advise H5 Operator to carry out the following

- Check opened 5L24A and 5L24T2 breakers
- Open 5V24H-G ground disconnect switch
- Turn on 125Vdc supply and close 5L24A-L24 and 5L24T2-L24 disconnect switches

SCC shall advise V2 Operator to carry out the following:

- Check opened 2L24A and 2L24L9 breakers
- Open 2V24H-G ground disconnect switch
- Turn on 125Vdc supply and close 2L24A-L24 and 2L24L9-L24 disconnect switches

1.2.2. Restoration of V24H line to service:

SCC shall:

- Advise the V2 and H5 Operators of readiness to restore V24H line to service
- Close (or advise the H5 Operator to close) 5L24A and 5L24T2 breakers
- Close (or advise the V2 Operator to close) 2L24A and 2L24L9 breakers

1.3. To restore V24H line to service after automatic outage

If V24H line trips auto due to fault:

V2 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 H5 Operator to energize) the line **ONCE** by closing 5L24A and 5L24T2 breakers
- Close (or advise the V2 Operator to close) 2L24A and 2L24L9 breakers

V2 Operator shall:

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

4.0. To take A2V line out of service

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

- Open 2L2A and 2L2L12 breakers

SCC shall carry out (or advise the A1 Operator to carry out) the following:

- Open 1DL2 and 1T2L2 breakers
- Check for no potential on A2V line

4.1. To take out, isolate and de-energize A2V line for work

- V2 Operator shall request for Station Guarantee from A1

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

- Open 2L2A and 2L2L12 breakers

SCC shall carry out (or advise the A1 Operator to carry out) the following:

- Open 1DL2 and 1T2L2 breakers

- Check for no potential on A2V line

SCC shall advise A1 Operator to carry out the following:

- Open 1DL2-L2 and 1T2L2-L2 disconnect switches and turn off its 125Vdc supply

- Close 1A2V-G ground disconnect switch

SCC shall advise V2 Operator to carry out the following:

- Open 2L2A-L2 and 2L2L22-L2 disconnect switches and turn off its 125Vdc supply

- Close 2A2V-G ground disconnect switch

4.2. To restore A2V line to service after work

4.2.1. Prepare A2V line for restoration

V2 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 A2V line

SCC shall advise A1 Operator to carry out the following

- Check opened 1DL2 and 1T2L2 breakers

- Open 1A2V-G ground disconnect switch

- Turn on 125Vdc supply and close 1DL2-L2 and 1T2L2-L2 disconnect switches

SCC shall advise V2 Operator to carry out the following:

- Check opened 2L2A and 2L2L12 breakers

- Open 2A2V-G ground disconnect switch

- Turn on 125Vdc supply and close 2L2A-L2 and 2L2L12-L2 disconnect switches

4.2.2. Restoration of A2V line to service:

SCC shall:

- Advise the V2 and A1 Operators of readiness to restore A2V line to service

- Close (or advise the A1 Operator to close) 1DL2 and 1T2L2 breakers
- Close (or advise the V2 Operator to close) 2L2A and 2L2L12 breakers

4.3. To restore A2V line to service after automatic outage

If A2V line trips auto due to fault:

V2 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 A1 Operator to energize) the line **ONCE** by closing 1DL2 and 1T2L2 breakers
- Close (or advise the V2 Operator to close) 2L2A and 2L2L12 breakers

V2 Operator shall:

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

4.4. To take A3V line out of service

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

- Open 2L3A and 2L3L13 breakers

SCC shall carry out (or advise the A1 Operator to carry out) the following:

- Open 1DL3 and 1T3L3 breakers
- Check for no potential on A3V line

4.5. To take out, isolate and de-energize A3V line for work

- V2 Operator shall request for Station Guarantee from A1

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

- Open 2L3A and 2L3L13 breakers

SCC shall carry out (or advise the A1 Operator to carry out) the following:

- Open 1DL3 and 1T3L3 breakers
- Check for no potential on A3V line

SCC shall advise A1 Operator to carry out the following:

- Open 1DL3-L3 and 1T3L3-L3 disconnect switches and turn off its 125Vdc supply
- Close 1A3V-G ground disconnect switch

SCC shall advise V2 Operator to carry out the following:

- Open 2L3A-L3 and 2L3L32-L3 disconnect switches and turn off its 125Vdc supply
- Close 2A3V-G ground disconnect switch

4.6. To restore A3V line to service after work

4.6.1. Prepare A3V line for restoration

V2 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 A3V line

SCC shall advise A1 Operator to carry out the following

- Check opened 1DL3 and 1T3L3 breakers
- Open 1A3V-G ground disconnect switch
- Turn on 125Vdc supply and close 1DL3-L3 and 1T3L3-L3 disconnect switches

SCC shall advise V2 Operator to carry out the following:

- Check opened 2L3A and 2L3L13 breakers
- Open 2A3V-G ground disconnect switch
- Turn on 125Vdc supply and close 2L3A-L3 and 2L3L13-L3 disconnect switches

4.6.2. Restoration of A3V line to service:

SCC shall:

- Advise the V2 and A1 Operators of readiness to restore A3V line to service
- Close (or advise the A1 Operator to close) 1DL3 and 1T3L3 breakers
- Close (or advise the V2 Operator to close) 2L3A and 2L3L13 breakers

4.7. To restore A3V line to service after automatic outage

If A3V line trips auto due to fault:

V2 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 A1 Operator to energize) the line **ONCE** by closing 1DL3 and 1T3L3 breakers
- Close (or advise the V2 Operator to close) 2L3A and 2L3L13 breakers

V2 Operator shall:

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

4.8. To take G25V line out of service

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

- Open 2L25A and 2L25L14 breakers

SCC shall carry out (or advise the G17 Operator to carry out) the following:

- Open 17G25V breaker
- Check for no potential on G25V line

4.9. To take out, isolate and de-energize G25V line for work

- V2 Operator shall request for Station Guarantee from G17

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

- Open 2L25A and 2L25L14 breakers

SCC shall carry out (or advise the G17 Operator to carry out) the following:

- Open 17G25V breaker
- Check for no potential on G25V line

SCC shall advise G17 Operator to carry out the following:

- Open 17G25V-L25 disconnect switch and turn off its 125Vdc supply
- Close 17G25V-G ground disconnect switch

SCC shall advise V2 Operator to carry out the following:

- Open 2L25A-L25 and 2L3L32-L25 disconnect switches and turn off its 125Vdc supply
- Close 2G25V-G ground disconnect switch

4.10. To restore G25V line to service after work

4.10.1. Prepare G25V line for restoration

V2 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 G25V line

SCC shall advise G17 Operator to carry out the following

- Check opened 17G25V breaker
- Open 17G25V-G ground disconnect switch
- Turn on 125Vdc supply and close 17G25V-L25 disconnect switch

SCC shall advise V2 Operator to carry out the following:

- Check opened 2L25A and 2L25L14 breakers
- Open 2G25V-G ground disconnect switch

- Turn on 125Vdc supply and close 2L25A-L25 and 2L25L14-L25 disconnect switches

4.10.2. Restoration of G25V line to service:

SCC shall:

- Advise the V2 and G17 Operators of readiness to restore G25V line to service
- Close (or advise the G17 Operator to close) 17G25V breaker
- Close (or advise the V2 Operator to close) 2L25A and 2L25L14 breakers

4.11. To restore G25V line to service after automatic outage

If G25V line trips auto due to fault:

V2 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 G17 Operator to energize) the line **ONCE** by closing 17G25V breaker
- Close (or advise the V2 Operator to close) 2L25A and 2L25L14 breakers

V2 Operator shall:

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

4.12. To take A5V line out of service

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

- Open 2L5A and 2L5L15 breakers

SCC shall carry out (or advise the A1 Operator to carry out) the following:

- Open 1DL5 and 1T5L5 breakers

- Check for no potential on A5V line

4.13. To take out, isolate and de-energize A5V line for work

- V2 Operator shall request for Station Guarantee from A1

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

- Open 2L5A and 2L5L15 breakers

SCC shall carry out (or advise the A1 Operator to carry out) the following:

- Open 1DL5 and 1T5L5 breakers
- Check for no potential on A5V line

SCC shall advise A1 Operator to carry out the following:

- Open 1DL5-L5 and 1T5L5-L5 disconnect switches and turn off its 125Vdc supply
- Close 1A5V-G ground disconnect switch

SCC shall advise V2 Operator to carry out the following:

- Open 2L5A-L5 and 2L5L15-L5 disconnect switches and turn off its 125Vdc supply
- Close 2A5V-G ground disconnect switch

4.14. To restore A5V line to service after work

4.14.1. Prepare A5V line for restoration

V2 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 A5V line

SCC shall advise A1 Operator to carry out the following

- Check opened 1DL5 and 1T5L5 breakers
- Open 2A5V-G ground disconnect switch
- Turn on 125Vdc supply and close 1DL5-L5 and 1T5L5-L5 disconnect switches

SCC shall advise V2 Operator to carry out the following:

- Check opened 2L5A and 2L5L15 breakers
- Open 2A5V-G ground disconnect switch
- Turn on 125Vdc supply and close 2L5A-L5 and 2L5L15-L5 disconnect switches

4.14.2. Restoration of A5V line to service:

SCC shall:

- Advise the V2 and A1 Operators of readiness to restore A5V line to service
- Close (or advise the A1 Operator to close) 1DL5 and 1T5L5 breakers
- Close (or advise the V2 Operator to close) 2L5A and 2L5L15 breakers

4.15. To restore A5V line to service after automatic outage

If A5V line trips auto due to fault:

V2 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 A1 Operator to energize) the line **ONCE** by closing 1DL5 and 1T5L5 breakers
- Close (or advise the V2 Operator to close) 2L5A and 2L5L15 breakers

V2 Operator shall:

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

4.16. To take A6V line out of service

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

- Open 2L6A and 2L6L16 breakers

SCC shall carry out (or advise the A1 Operator to carry out) the following:

- Open 1DL6 and 1T6L6 breakers

- Check for no potential on A6V line

4.17. To take out, isolate and de-energize A6V line for work

- V2 Operator shall request for Station Guarantee from A1

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

- Open 2L6A and 2L6L16 breakers

SCC shall carry out (or advise the A1 Operator to carry out) the following:

- Open 1DL6 and 1T6L6 breakers

- Check for no potential on A6V line

SCC shall advise A1 Operator to carry out the following:

- Open 1DL6-L6 and 1T6L6-L6 disconnect switches and turn off its 125Vdc supply

- Close 1A6V-G ground disconnect switch

SCC shall advise V2 Operator to carry out the following:

- Open 2L6A-L6 and 2L6L16-L6 disconnect switches and turn off its 125Vdc supply

- Close 2A6V-G ground disconnect switch

4.18. To restore A6V line to service after work

4.18.1. Prepare A6V line for restoration

V2 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 A6V line

SCC shall advise A1 Operator to carry out the following

- Check opened 1DL6 and 1T6L6 breakers

- Open 1A6V-G ground disconnect switch

- Turn on 125Vdc supply and close 1DL6-L6 and 1T6L6-L6 disconnect switches

SCC shall advise V2 Operator to carry out the following:

- Check opened 2L6A and 2L6L16 breakers

- Open 2A6V-G ground disconnect switch

- Turn on 125Vdc supply and close 2L6A-L6 and 2L6L16-L6 disconnect switches

4.18.2. Restoration of A6V line to service:

SCC shall:

- Advise the V2 and A1 Operators of readiness to restore A6V line to service

- Close (or advise the A1 Operator to close) 1DL6 and 1T6L6 breakers

- Close (or advise the V2 Operator to close) 2L6A and 2L6L16 breakers

4.19. To restore A6V line to service after automatic outage

If A6V line trips auto due to fault:

V2 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 A1 Operator to energize) the line **ONCE** by closing 1DL6 and 1T6L6 breaker

- Close (or advise the V2 Operator to close) 2L6A and 2L6L16 breakers

V2 Operator shall:

- Advise the Supervisor/Area Manager of operation above

- Advise maintenance men to patrol the line if the operation above is not

successful

4.20. To take V7AE line out of service

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

- Open 2L7A and 2L7L11 breakers

SCC shall carry out (or advise the AE59 Operator to carry out) the following:

- Open 59L7A and 59L5T2 breakers
- Check for no potential on V7AE line

4.21. To take out, isolate and de-energize V7AE line for work

- V2 Operator shall request for Station Guarantee from AE59

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

- Open 2L7A and 2L7L11 breakers

SCC shall carry out (or advise the AE59 Operator to carry out) the following:

- Open 59L7A and 59L5T2 breakers
- Check for no potential on V7AE line

SCC shall advise AE59 Operator to carry out the following:

- Open 59L7A-L7 and 59L5T2-L7 disconnect switches and turn off its 125Vdc supply
- Close 59V7AE-G ground disconnect switch

SCC shall advise V2 Operator to carry out the following:

- Open 2L7A-L7 and 2L7L11-L7 disconnect switches and turn off its 125Vdc supply
- Close 2V7AE-G ground disconnect switch

4.22. To restore V7AE line to service after work

4.22.1. Prepare V7AE line for restoration

V2 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 V7AE line

SCC shall advise AE59 Operator to carry out the following

- Check opened 59L7A and 59L5T2 breakers
- Open 59V7AE-G ground disconnect switch
- Turn on 125Vdc supply and close 59L7A-L7 and 59L5T2-L7 disconnect switches

SCC shall advise V2 Operator to carry out the following:

- Check opened 2L7A and 2L7L11 breakers
- Open 2V7AE-G ground disconnect switch
- Turn on 125Vdc supply and close 2L7A-L7 and 2L7L11-L7 disconnect switches

4.22.2. Restoration of V7AE line to service:

SCC shall:

- Advise the V2 and AE59 Operators of readiness to restore V7AE line to service
- Close (or advise the AE59 Operator to close) 59L7A and 59L5T2 breakers
- Close (or advise the V2 Operator to close) 2L7A and 2L7L11 breakers

4.23. To restore V7AE line to service after automatic outage

If V7AE line trips auto due to fault:

V2 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 V2 Operator to energize) the line **ONCE** by closing 2L7A and 2L7L11 breakers

- Close (or advise the AE59 Operator to close) 59L7A and 59L5T2 breakers

V2 Operator shall:

- Advise the Supervisor/Area Manager of operation above

- Advise maintenance men to patrol the line if the operation above is not successful

4.24. To take V8AE line out of service

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

- Open 2L8A and 2L8L10 breakers

SCC shall carry out (or advise the AE59 Operator to carry out) the following:

- Open 59L8A and 59L6L8 breakers

- Check for no potential on V8AE line

4.25. To take out, isolate and de-energize V8AE line for work

- V2 Operator shall request for Station Guarantee from AE59

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

- Open 2L8A and 2L8L10 breakers

SCC shall carry out (or advise the AE59 Operator to carry out) the following:

- Open 59L8A and 59L6L8 breakers

- Check for no potential on V8AE line

SCC shall advise AE59 Operator to carry out the following:

- Open 59L8A-L8 and 59L6L8-L8 disconnect switches and turn off its 125Vdc supply

- Close 59V8AE-G ground disconnect switch

SCC shall advise V2 Operator to carry out the following:

- Open 2L8A-L8 and 2L8L10-L8 disconnect switches and turn off its 125Vdc supply

- Close 2V8AE-G ground disconnect switch

4.26. To restore V8AE line to service after work

4.26.1. Prepare V8AE line for restoration

V2 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 V8AE line

SCC shall advise AE59 Operator to carry out the following

- Check opened 59L8A and 59L6L8 breakers

- Open 59V8AE-G ground disconnect switch

- Turn on 125Vdc supply and close 59L8A-L8 and 59L6L8-L8 disconnect switches

SCC shall advise V2 Operator to carry out the following:

- Check opened 2L8A and 2L8L10 breakers

- Open 2V8AE-G ground disconnect switch

- Turn on 125Vdc supply and close 2L8A-L8 and 2L8L10-L8 disconnect switches

4.26.2. Restoration of V8AE line to service:

SCC shall:

- Advise the V2 and AE59 Operators of readiness to restore V8AE line to service

- Close (or advise the V2 Operator to close) 2L8A and 2L8L10 breakers

- Close (or advise the AE59 Operator to close) 59L8A and 59L6L8 breakers

4.27. To restore V8AE line to service after automatic outage

If V8AE line trips auto due to fault:

V2 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 V2 Operator to energize) the line **ONCE** by closing 2L8A and 2L8L10 breakers

- Close (or advise the AE59 Operator to close) 59L8A and 59L6L8 breakers

V2 Operator shall:

- Advise the Supervisor/Area Manager of operation above

- Advise maintenance men to patrol the line if the operation above is not successful

4.28. To take V9E line out of service

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

- Open 2DL9 and 2L8L10 breakers

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

- Open 4A1L9 breaker

- Check for no potential on V9E line

4.29. To take out, isolate and de-energize V9E line for work

- V2 Operator shall request for Station Guarantee from E4

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

- Open 2DL9 and 2L24L9 breakers

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

- Open 4A1L9 breaker

- Check for no potential on V9E line

SCC shall advise E4 Operator to carry out the following:

- Open 4A1L9-L9 disconnect switch and turn off its 125Vdc supply

- Close 4V9E-G ground disconnect switch

SCC shall advise V2 Operator to carry out the following:

- Open 2DL9-L9 and 2L24L9-L9 disconnect switches and turn off its 125Vdc supply

- Close 2V9E-G ground disconnect switch

4.30. To restore V9E line to service after work

4.30.1. Prepare V9E line for restoration

V2 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 V9E line

SCC shall advise E4 Operator to carry out the following

- Check opened 4A1L9 breaker

- Open 4V9E-G ground disconnect switch

- Turn on 125Vdc supply and close 4A1L9-L9 disconnect switch

SCC shall advise V2 Operator to carry out the following:

- Check opened 2DL9 and 2L24L9 breakers

- Open 2V9E-G ground disconnect switch

- Turn on 125Vdc supply and close 2DL9-L9 and 2L24L9-L9 disconnect switches

4.30.2. Restoration of V9E line to service:

SCC shall:

- Advise the V2 and E4 Operators of readiness to restore V9E line to service

- Close (or advise the E4 Operator to close) 4A1L9 breakers

- Close (or advise the V2 Operator to close) 2DL9 and 2L24L9 breakers

4.31. To restore V9E line to service after automatic outage

If V9E line trips auto due to fault:

V2 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 4A1L9 breaker
- Close (or advise the V2 Operator to close) 2DL9 and 2L24L9 breakers

V2 Operator shall:

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

4.32. To take V10E line out of service

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

- Open 2DL10 and 2L7L10 breakers

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

- Open 4A2L10 breaker
- Check for no potential on V10E line

4.33. To take out, isolate and de-energize V10E line for work

- V2 Operator shall request for Station Guarantee from E4

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

- Open 2DL10 and 2L8L10 breakers

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

- Open 4A2L10 breakers
- Check for no potential on V10E line

SCC shall advise E4 Operator to carry out the following:

- Open 4A2L10-L10 disconnect switch and turn off its 125Vdc supply

- Close 4V10E-G ground disconnect switch

SCC shall advise V2 Operator to carry out the following:

- Open 2DL10-L10 and 2L8L10-L10 disconnect switches and turn off its 125Vdc supply

- Close 2V10E-G ground disconnect switch

4.34. To restore V10E line to service after work

4.34.1. Prepare V10E line for restoration

V2 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 V10E line

SCC shall advise E4 Operator to carry out the following

- Check opened 4A2L10 breaker

- Open 4V10E-G ground disconnect switch

- Turn on 125Vdc supply and close 4A2L10-L10 disconnect switch

SCC shall advise V2 Operator to carry out the following:

- Check opened 2DL10 and 2L8L10 breakers

- Open 2V10E-G ground disconnect switch

- Turn on 125Vdc supply and close 2DL10-L10 and 2L8L10-L10 disconnect switches

4.34.2. Restoration of V10E line to service:

SCC shall:

- Advise the V2 and E4 Operators of readiness to restore V10E line to service

- Close (or advise the E4 Operator to close) 4A2L10 breaker

- Close (or advise the V2 Operator to close) 2DL10 and 2L8L10 breakers

4.35. To restore V10E line to service after automatic outage

If V10E line trips auto due to fault:

V2 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 V2 Operator to energize) the line **ONCE** by closing 2DL10 and 2L8L10 breakers
- Close (or advise the E4 Operator to close) 4A2L10 breaker

V2 Operator shall:

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

4.36. To take V11SM line out of service

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

- Open 2DL11 and 2L1L11 breakers

SCC shall carry out (or advise the SM60 Operator to carry out) the following:

- Open 60L11A and 60L11L1 breakers
- Check for no potential on V11SM line

4.37. To take out, isolate and de-energize V11SM line for work

- V2 Operator shall request for Station Guarantee from SM60

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

- Open 2DL11 and 2L1L11 breakers

SCC shall advise SM60 Operator to carry out the following:

- Open 60L11A and 60L11L1 breakers

- Check for no potential on V11SM line

SCC shall advise SM60 Operator to carry out the following:

- Open 60L11A-L11 and 60L11L1-L11 disconnect switches and turn off its 125Vdc supply

- Close 60V11SM-G ground disconnect switch

SCC shall advise V2 Operator to carry out the following:

- Open 2DL11-L11 and 2L7L11-L11 disconnect switches and turn off its 125Vdc supply

- Close 2V11SM-G ground disconnect switch

4.38. To restore V11SM line to service after work

4.38.1. Prepare V11SM line for restoration

V2 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 V11SM line

SCC shall advise SM60 Operator to carry out the following

- Check opened 60L11A and 60L11L1 breakers

- Open 60V11SM-G ground disconnect switch

- Turn on 125Vdc supply and close 60L11A-L11 and 60L11L1-L11 disconnect switches

SCC shall advise V2 Operator to carry out the following:

- Check opened 2DL11 and 2L7L11 breakers

- Open 2V11SM-G ground disconnect switch

- Turn on 125Vdc supply and close 2DL11-L11 and 2L7L11-L11 disconnect switches

4.38.2. Restoration of V11SM line to service:

SCC shall:

- Advise the V2 and SM60 Operators of readiness to restore V11SM line to service

- Close (or advise the SM60 Operator to close) 60L11A and 60L11L1 breakers

- Close (or advise the V2 Operator to close) 2DL11 and 2L1L11 breakers

4.39. To restore V11SM line to service after automatic outage

If V11SM line trips auto due to fault:

V2 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 V2 Operator to energize) the line **ONCE** by closing 2DL11 and 2L1L11 breakers

- Close (or advise the SM60 Operator to close) 60L11A and 60L11L1 breakers

V2 Operator shall:

- Advise the Supervisor/Area Manager of operation above

- Advise maintenance men to patrol the line if the operation above is not successful

4.40. To take V12SM line out of service

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

- Open 2DL12 and 2L2L12 breakers

SCC shall carry out (or advise the SM60 Operator to carry out) the following:

- Open 60L12A and 60L12L2 breaker

- Check for no potential on V12SM line

4.41. To take out, isolate and de-energize V12SM line for work

- V2 Operator shall request for Station Guarantee from SM60

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

- Open 2DL12 and 2L2L12 breakers

SCC shall carry out (or advise the SM60 Operator to carry out) the following:

- Open 60L12A and 60L12L2 breakers

- Check for no potential on V12SM line

SCC shall advise SM60 Operator to carry out the following:

- Open 60L12A-L12 and 60L12L2-L12 disconnect switches and turn off its 125Vdc supply

- Close 60V12SM-G ground disconnect switch

SCC shall advise V2 Operator to carry out the following:

- Open 2DL12-L12 and 2L2L12-L12 disconnect switches and turn off its 125Vdc supply

- Close 2V12SM-G ground disconnect switch

4.42. To restore V12SM line to service after work

4.42.1. Prepare V12SM line for restoration

V2 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 V12SM line

SCC shall advise SM60 Operator to carry out the following

- Check opened 60L12A and 60L12L2 breakers

- Open 60V12SM-G ground disconnect switch

- Turn on 125Vdc supply and close 60L12A-L12 and 60L12L1-L12 disconnect switches

SCC shall advise V2 Operator to carry out the following:

- Check opened 2DL12 and 2L7L12 breakers

- Open 2V12SM-G ground disconnect switch

- Turn on 125Vdc supply and close 2DL12-L12 and 2L2L12-L12 disconnect switches

4.42.2. Restoration of V12SM line to service:

SCC shall:

- Advise the V2 and SM60 Operators of readiness to restore V12SM line to service
- Close (or advise the SM60 Operator to close) 60L12A and 60L12L2 breakers
- Close (or advise the V2 Operator to close) 2DL12 and 2L2L12 breakers

4.43. To restore V12SM line to service after automatic outage

If V12SM line trips auto due to fault:

V2 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 V2 Operator to energize) the line **ONCE** by closing 2DL12 and 2L2L12 breakers
- Close (or advise the SM60 Operator to close) 60L12A and 60L12L2 breakers

V2 Operator shall:

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

4.44. To take V13SM line out of service

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

- Open 2DL13 and 2L3L13 breakers

SCC shall carry out (or advise the SM60 Operator to carry out) the following:

- Open 60L13A and 60L13L3 breakers
- Check for no potential on V13SM line

4.45. To take out, isolate and de-energize V13SM line for work

- V2 Operator shall request for Station Guarantee from SM60

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

- Open 2DL13 and 2L3L13 breakers

SCC shall carry out (or advise the SM60 Operator to carry out) the following:

- Open 60L13A and 60L13L3 breakers
- Check for no potential on V13SM line

SCC shall advise SM60 Operator to carry out the following:

- Open 60L13A-L13 and 60L13L3-L13 disconnect switches and turn off its 125Vdc supply
- Close 60V13SM-G ground disconnect switch

SCC shall advise V2 Operator to carry out the following:

- Open 2DL13-L13 and 2L3L13-L13 disconnect switches and turn off its 125Vdc supply
- Close 2V13SM-G ground disconnect switch

4.46. To restore V13SM line to service after work

4.46.1. Prepare V13SM line for restoration

V2 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 V13SM line

SCC shall advise SM60 Operator to carry out the following

- Check opened 60L13A and 60L13L3 breakers

- Open 60V13SM-G ground disconnect switch

- Turn on 125Vdc supply and close 60L13A-L13 and 60L13L1-L13 disconnect switches

SCC shall advise V2 Operator to carry out the following:

- Check opened 2DL13 and 2L7L13 breakers

- Open 2V13SM-G ground disconnect switch

- Turn on 125Vdc supply and close 2DL13-L13 and 2L3L13-L13 disconnect switches

4.46.2. Restoration of V13SM line to service:

SCC shall:

- Advise the V2 and SM60 Operators of readiness to restore V13SM line to service

- Close (or advise the V2 Operator to close) 2DL13 and 2L3L13 breakers

- Close (or advise the SM60 Operator to close) 60L13A and 60L13L3 breakers

4.47. To restore V13SM line to service after automatic outage

If V13SM line trips auto due to fault:

V2 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 V2 Operator to energize) the line **ONCE** by closing 2DL13 and 2L3L13 breakers

- Close (or advise the SM60 Operator to close) 60L13A and 60L13L3 breakers

V2 Operator shall:

- Advise the Supervisor/Area Manager of operation above

- Advise maintenance men to patrol the line if the operation above is not successful

4.48. To take V14SM line out of service

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

- Open 2DL14 and 2L25L14 breakers

SCC shall carry out (or advise the SM60 Operator to carry out) the following:

- Open 60L14A and 60L14L4 breakers

- Check for no potential on V14SM line

4.49. To take out, isolate and de-energize V14SM line for work

- V2 Operator shall request for Station Guarantee from SM60

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

- Open 2DL14 and 2L25L14 breakers

SCC shall carry out (or advise the SM60 Operator to carry out) the following:

- Open 60L14A and 60L14L4 breakers

- Check for no potential on V14SM line

SCC shall advise SM60 Operator to carry out the following:

- Open 60L14A-L14 and 60L14L4-L14 disconnect switches and turn off its 125Vdc supply

- Close 60V14SM-G ground disconnect switch

SCC shall advise V2 Operator to carry out the following:

- Open 2DL14-L14 and 2L25L14-L14 disconnect switches and turn off its 125Vdc supply

- Close 2V14SM-G ground disconnect switch

4.50. To restore V14SM line to service after work

4.50.1. Prepare V14SM line for restoration

V2 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 V14SM line

SCC shall advise SM60 Operator to carry out the following

- Check opened 60L14A and 60L14L4 breakers

- Open 60V14SM-G ground disconnect switch

- Turn on 125Vdc supply and close 60L14A-L14 and 60L14L1-L14 disconnect switches

SCC shall advise V2 Operator to carry out the following:

- Check opened 2DL14 and 2L25L14 breakers

- Open 2V14SM-G ground disconnect switch

- Turn on 125Vdc supply and close 2DL14-L14 and 2L25L14-L14 disconnect switches

4.50.2. Restoration of V14SM line to service:

SCC shall:

- Advise the V2 and SM60 Operators of readiness to restore V14SM line to service

- Close (or advise the V2 Operator to close) 2DL14 and 2L25L14 breakers

- Close (or advise the SM60 Operator to close) 60L14A and 60L14L4 breakers

4.51. To restore V14SM line to service after automatic outage

If V14SM line trips auto due to fault:

V2 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 V2 Operator to energize) the line **ONCE** by closing 2DL14 and 2L25L14 breakers

- Close (or advise the SM60 Operator to close) 60L14A and 60L14L4 breakers

V2 Operator shall:

- Advise the Supervisor/Area Manager of operation above

- Advise maintenance men to patrol the line if the operation above is not successful

4.52. To take V15SM line out of service

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

- Open 2DL15 and 2L5L15 breakers

SCC shall carry out (or advise the SM60 Operator to carry out) the following:

- Open 60L15A and 60L15L5 breakers

- Check for no potential on V15SM line

4.53. To take out, isolate and de-energize V15SM line for work

- V2 Operator shall request for Station Guarantee from SM60

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

- Open 2DL15 and 2L5L15 breakers

SCC shall carry out (or advise the SM60 Operator to carry out) the following:

- Open 60L15A and 60L15L5 breakers

- Check for no potential on V15SM line

SCC shall advise SM60 Operator to carry out the following:

- Open 60L15A-L15 and 60L15L5-L15 disconnect switches and turn off its 125Vdc supply

- Close 60V15SM-G ground disconnect switch

SCC shall advise V2 Operator to carry out the following:

- Open 2DL15-L15 and 2L5L15-L15 disconnect switches and turn off its 125Vdc supply

- Close 2V15SM-G ground disconnect switch

4.54. To restore V15SM line to service after work

4.54.1. Prepare V15SM line for restoration

V2 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 V15SM line

SCC shall advise SM60 Operator to carry out the following

- Check opened 60L15A and 60L15L5 breakers

- Open 60V15SM-G ground disconnect switch

- Turn on 125Vdc supply and close 60L15A-L15 and 60L15L1-L15 disconnect switches

SCC shall advise V2 Operator to carry out the following:

- Check opened 2DL15 and 2L5L15 breakers

- Open 2V15SM-G ground disconnect switch

- Turn on 125Vdc supply and close 2DL15-L15 and 2L5L15-L15 disconnect switches

4.54.2. Restoration of V15SM line to service:

SCC shall:

- Advise the V2 and SM60 Operators of readiness to restore V15SM line to service

- Close (or advise the V2 Operator to close) 2DL15 and 2L5L15 breakers

- Close (or advise the SM60 Operator to close) 60L15A and 60L15L5 breakers

4.55. To restore V15SM line to service after automatic outage

If V15SM line trips auto due to fault:

V2 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 V2 Operator to energize) the line **ONCE** by closing 2DL15 and 2L5L15 breakers
- Close (or advise the SM60 Operator to close) 60L15A and 60L15L5 breakers

V2 Operator shall:

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

4.56. To take V16SM line out of service

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

- Open 2DL16 and 2L6L16 breakers

SCC shall carry out (or advise the SM60 Operator to carry out) the following:

- Open 60L16A and 60L16L7 breakers
- Check for no potential on V16SM line

4.57. To take out, isolate and de-energize V16SM line for work

- V2 Operator shall request for Station Guarantee from SM60

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

- Open 2DL16 and 2L6L16 breakers

SCC shall carry out (or advise the SM60 Operator to carry out) the following:

- Open 60L16A and 60L16L7 breakers

- Check for no potential on V16SM line

SCC shall advise SM60 Operator to carry out the following:

- Open 60L16A-L16 and 60L16L7-L16 disconnect switches and turn off its 125Vdc supply

- Close 60V16SM-G ground disconnect switch

SCC shall advise V2 Operator to carry out the following:

- Open 2DL16-L16 and 2L6L16-L16 disconnect switches and turn off its 125Vdc supply

- Close 2V16SM-G ground disconnect switch

4.58. To restore V16SM line to service after work

4.58.1. Prepare V16SM line for restoration

V2 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 V16SM line

SCC shall advise SM60 Operator to carry out the following

- Check opened 60L16A and 60L16L7 breakers

- Open 60V16SM-G ground disconnect switch

- Turn on 125Vdc supply and close 60L16A-L16 and 60L16L7-L16 disconnect switches

SCC shall advise V2 Operator to carry out the following:

- Check opened 2DL16 and 2L6L16 breakers

- Open 2V16SM-G ground disconnect switch

- Turn on 125Vdc supply and close 2DL16-L16 and 2L6L16-L16 disconnect switches

4.58.2. Restoration of V16SM line to service:

SCC shall:

- Advise the V2 and SM60 Operators of readiness to restore V16SM line to service

- Close (or advise the V2 Operator to close) 2DL16 and 2L6L16 breakers

- Close (or advise the SM60 Operator to close) 60L16A and 60L16L7 breakers

4.59. To restore V16SM line to service after automatic outage

If V16SM line trips auto due to fault:

V2 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 V2 Operator to energize) the line **ONCE** by closing 2DL16 and 2L6L16 breakers

- Close (or advise the SM60 Operator to close) 60L16A and 60L16L7 breakers

V2 Operator shall:

- Advise the Supervisor/Area Manager of operation above

- Advise maintenance men to patrol the line if the operation above is not successful

4.60. To take V17FZ line out of service

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

- Open 2DL17 and 2L18L17 breakers

SCC shall carry out (or advise the FZ72 Operator to carry out) the following:

- Open 72L17A and 72L17T1 breakers

- Check for no potential on V17FZ line

4.61. To take out, isolate and de-energize V17FZ line for work

- V2 Operator shall request for Station Guarantee from FZ72

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

- Open 2DL17 and 2L18L17 breakers

SCC shall carry out (or advise the FZ72 Operator to carry out) the following:

- Open 72L17A and 72L17T1 breakers

- Check for no potential on V17FZ line

SCC shall advise FZ72 Operator to carry out the following:

- Open 72L17A-L17 and 72L17T1-L17 disconnect switches and turn off its 125Vdc supply

- Close 72V17FZ-G ground disconnect switch

SCC shall advise V2 Operator to carry out the following:

- Open 2DL17-L17 and 2L18L17-L17 disconnect switches and turn off its 125Vdc supply

- Close 2V17FZ-G ground disconnect switch

4.62. To restore V17FZ line to service after work

4.62.1. Prepare V17FZ line for restoration

V2 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 V17FZ line

SCC shall advise FZ72 Operator to carry out the following

- Check opened 72L17A and 72L17T1 breakers

- Open 72V17FZ-G ground disconnect switch

- Turn on 125Vdc supply and close 72L17A-L17 and 72L17T1-L17 disconnect switches

SCC shall advise V2 Operator to carry out the following:

- Check opened 2DL17 and 2L18L17 breakers

- Open 2V17FZ-G ground disconnect switch

- Turn on 125Vdc supply and close 2DL17-L17 and 2L18L17-L17 disconnect switches

4.62.2. Restoration of V17FZ line to service:

SCC shall:

- Advise the V2 and FZ72 Operators of readiness to restore V17FZ line to service
- Close (or advise the FZ72 Operator to close) 72L17A and 72L17T1 breakers
- Close (or advise the V2 Operator to close) 2DL17 and 2L18L17 breakers

4.63. To restore V17FZ line to service after automatic outage

If V17FZ line trips auto due to fault:

V2 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 V2 Operator to energize) the line **ONCE** by closing 2DL17 and 2L18L17 breakers
- Close (or advise the FZ72 Operator to close) 72L17A and 72L17T1 breakers

V2 Operator shall:

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

4.64. To take Z18V line out of service

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

- Open 2L18A and 2L18L17 breakers

SCC shall carry out (or advise the Z19 Operator to carry out) the following:

- Open 19ADL18 breaker
- Check for no potential on Z18V line

4.65. To take out, isolate and de-energize Z18V line for work

- V2 Operator shall request for Station Guarantee from Z19

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

- Open 2L18A and 2L18L17 breakers

SCC shall carry out (or advise the Z19 Operator to carry out) the following:

- Open 19ADL18 breaker
- Check for no potential on Z18V line

SCC shall advise Z19 Operator to carry out the following:

- Open 19ADL18-L18 disconnect switch and turn off its 125Vdc supply
- Close 19Z18V-G ground disconnect switch

SCC shall advise V2 Operator to carry out the following:

- Open 2L18A-L18 and 2L18L17-L18 disconnect switches and turn off its 125Vdc supply
- Close 2Z18V-G ground disconnect switch

4.66. To restore Z18V line to service after work

4.66.1. Prepare Z18V line for restoration

V2 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 Z18V line

SCC shall advise Z19 Operator to carry out the following

- Check opened 19ADL18 breaker
- Open 19Z18V-G ground disconnect switch

- Turn on 125Vdc supply and close 19ADL18-L18 disconnect switch

SCC shall advise V2 Operator to carry out the following:

- Check opened 2L18A and 2L18L17 breakers
- Open 2Z18V-G ground disconnect switch
- Turn on 125Vdc supply and close 2L18A-L18 and 2L18L17-L18 disconnect switches

4.66.2. Restoration of Z18V line to service:

SCC shall:

- Advise the V2 and Z19 Operators of readiness to restore Z18V line to service
- Close (or advise the Z19 Operator to close) 19ADL18 breaker
- Close (or advise the V2 Operator to close) 2L18A and 2L18L17 breakers

4.67. To restore Z18V line to service after automatic outage

If Z18V line trips auto due to fault:

V2 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 Z19 Operator to energize) the line **ONCE** by closing 19ADL18 breaker
- Close (or advise the V2 Operator to close) 2L18A and 2L18L17 breakers

V2 Operator shall:

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

4.68. To take V19H line out of service

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

- Open 2L19A and 2L19T2 breakers

SCC shall carry out (or advise the H5 Operator to carry out) the following:

- Open 5L19A and 5L19T1 breakers
- Check for no potential on V19H line

4.69. To take out, isolate and de-energize V19H line for work

- V2 Operator shall request for Station Guarantee from H5

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

- Open 2L19A and 2L19T2 breakers

SCC shall carry out (or advise the H5 Operator to carry out) the following:

- Open 5L19A and 5L19T1 breakers
- Check for no potential on V19H line

SCC shall advise H5 Operator to carry out the following:

- Open 5L19A-L19 and 5L19T1-L19 disconnect switches and turn off its 125Vdc supply
- Close 5V19H-G ground disconnect switch

SCC shall advise V2 Operator to carry out the following:

- Open 2L19A-L19 and 2L19T2-L19 disconnect switches and turn off its 125Vdc supply
- Close 2V19H-G ground disconnect switch

4.70. To restore V19H line to service after work

4.70.1. Prepare V19H line for restoration

V2 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 V19H line

SCC shall advise H5 Operator to carry out the following

- Check opened 5L19A and 5L19T1 breakers
- Open 5V19H-G ground disconnect switch
- Turn on 125Vdc supply and close 5L19A-L19 and 5L19T1-L19 disconnect switches

SCC shall advise V2 Operator to carry out the following:

- Check opened 2L19A and 2L19T2 breakers
- Open 2V19H-G ground disconnect switch
- Turn on 125Vdc supply and close 2L19A-L19 and 2L19T2-L19 disconnect switches

4.70.2. Restoration of V19H line to service:

SCC shall:

- Advise the V2 and H5 Operators of readiness to restore V19H line to service
- Close (or advise the V2 Operator to close) 2L19A and 2L19T2 breakers
- Close (or advise the H5 Operator to close) 5L19A and 5L19T1 breakers

4.71. To restore V19H line to service after automatic outage

If V19H line trips auto due to fault:

V2 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 V2 Operator to energize) the line **ONCE** by closing 2L19A and 2L19T2 breakers

- Close (or advise the H5 Operator to close) 5L19A and 5L19T1 breakers

V2 Operator shall:

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

4.72. To isolate 2T1 Transformer for work

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

- Open 2AT1 and 2DT1 breakers
- Open 2ET1 and 2T1T2 breakers
- Check for no potential on 2T1 Bank

SCC shall advise V2 Operator to carryout the following:

- Open 2AT1-T1 and 2DT1-T1 disconnect switches and turn off its 125Vdc supply
- Open 2ET1-T1 and 2T1T2-T1 disconnect switches and turn off its 125Vdc supply

4.73. To prepare 2T1 Bank for service after work

V2 Operator shall:

- Advise SCC when work on the line has been completed and permit(s) surrendered (including all Station Guarantees)
- Check for no potential 2T1 Bank
- Turn on 125Vdc supply and close 2AT1-T1 and 2DT1-T1 disconnect switches
- Turn on 125Vdc supply and close 2ET1-T1 and 2T1T2-T1 disconnect switches

SCC shall:

- Advise the V2 Operator of readiness to restore 2T1 Bank to service
- Close (or advise the V2 Operator to close) 2AT1 and 2DT1 breakers
- Close (or advise the V2 Operator to close) 2ET1 and 2T1T2 breakers

4.74. To restore 2T1 Bank to service after automatic outage

If 2T1 bank trips auto due to fault:

V2 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 V2 Operator to energize) the line **ONCE** by closing 2AT1 and 2DT1 breakers
- Close (or advise the V2 Operator to close) 2ET1 and 2T1T2 breakers

V2 Operator shall:

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

4.75. To isolate 2T2 Transformer for work

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

- Open 2DT2 and 2L19T2 breakers
- Open 2ET2 and 2T1T2 breakers
- Check for no potential on 2T2 Bank

SCC shall advise V2 Operator to carryout the following:

- Open 2DT2-T2 and 2L19T2-T2 disconnect switches and turn off its 125Vdc supply
- Open 2ET2-T2 and 2T1T2-T2 disconnect switches and turn off its 125Vdc supply

4.76. To prepare 2T2 Bank for service after work

V2 Operator shall:

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

- Check for no potential 2T2 Bank
- Turn on 125Vdc supply and close 2DT2-T2 and 2L19T2-T2 disconnect switches
- Turn on 125Vdc supply and close 2ET2-T2 and 2T1T2-T2 disconnect switches

SCC shall:

- Advise the V2 Operator of readiness to restore 2T2 Bank to service
- Close (or advise the V2 Operator to close) 2DT2 and 2L19T2 breakers
- Close (or advise the V2 Operator to close) 2ET2 and 2T1T2 breakers

4.77. To restore 2T2 Bank to service after automatic outage

If 2T2 Bank trips auto due to fault:

V2 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 V2 Operator to energize) the line **ONCE** by closing 2DT2 and 2L19T2 breakers
- Close (or advise the V2 Operator to close) 2ET2 and 2T1T2 breakers

V2 Operator shall:

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

4.78. To isolate 2T3 Transformer for work

- V2 Operator shall inform Departments and Sections about outage on 2T3 transformer

- Open AC3 Contactor/MCB to take off supply to 2T3 transformer auxiliaries

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

- Open 2BF1 and 2BF2 breakers
- Open 2DT3 breaker

SCC shall advise V2 Operator to carry out the following:

- Open 2BF1-B disconnect switch
- Open 2BF2-B disconnect switch
- Check for no potential on 2T3 Bank
- Open 2DT3-D disconnect switch and turn off its 125Vdc supply

4.79. To restore 2T3 Bank to service

4.79.1. Prepare 2T3 Bank restoration:

V2 Operator shall:

- Advise SCC when work on the bank has been completed and permit(s) surrendered (including all Station Guarantees)
- Check for no potential and grounds removed on 2T3 Bank
- Close 2BF1-B disconnect switch
- Close 2BF2-B disconnect switch
- Turn on 125Vdc supply and close 2DT3-D disconnect switch
- Advise SCC of readiness to restore 2T3 Bank to service

4.79.2. Restoration of 2T3 Bank:

- SCC shall close (or advise V2 Operator to close) the 2DT3 breaker
- V2 Operator shall advise Departments and Sections of readiness to restore 2F1 and 2F2 Feeders to service
- SCC shall close (or advise V2 Operator to close) 2BF1 and 2BF2 breakers

4.80. To restore 2T3 Bank to service after automatic outage

If 2T3 Bank trips auto due to fault:

V2 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 V2 Operator to energize) the bank **ONCE** by closing 2DT3 breaker

V2 Operator shall advise Departments and Sections of readiness to restore 2F1 and 2F2 feeders to service

SCC shall close (or advise V2 Operator to close) 2BF1 and 2BF2 breakers

V2 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

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 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 V1H, A2V, A3V, A5V, A6V, V7AE, V8AE, V9E, V10E, V11SM, V12SM, V13SM, V14SM, V15SM, V16SM, V17FZ, Z18V, V19H, G25V lines, 2T1 and 2T2 (330/161kV) Transformers, and 2T3 (161/11kV) transformer.

5. Approval

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Director, Technical Services