
	<b>Torrent Power Ltd. – Distribution Franchise</b>	Doc. No.: TPDF02-DIS01-OCP-005
	<b>OCP - DISTRIBUTION NETWORK ISOLATION AND NORMALIZATION</b>	Rev. No. /Dt: 01 / 01.12.2022

## DOCUMENT CONTROL


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<b>Title of Document</b>	<b>DISTRIBUTION NETWORK ISOLATION AND NORMALIZATION</b>	
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1	1	0	01.12.2021	First Issue	Shilajit Ray Satish Shah	Snehal Shah Abdulrashid Shaikh
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## 1. PURPOSE

- 1.1. Distribution network Isolation and Normalization, Feeder Load Transfer, Sectionalisation of faulty leg

## 2. SCOPE OF DOCUMENT

- 2.1. The scope of this document is to define Distribution network Isolation and Normalization, Feeder Load Transfer, Sectionalisation of faulty leg.
- 2.2. The process document aims to define the guidelines to ensure the process effectiveness as required by the Integrated Management System whenever implemented.

## 3. FIELD OF APPLICATION

- 3.1. This procedure is used for Distribution network Isolation and Normalization, Feeder Load Transfer, Sectionalisation of faulty leg in TPL-D's Franchisee areas of Bhiwandi & SMK.

## 4. FREQUENCY

- 4.1. As and when required

## 5. AUTHORITIES AND RESPONSIBILITY

- 5.1. The Head of Distribution is responsible for implementation of this procedure for effectiveness.
- 5.2. The Head of HT O&M/Projects at respective locations are responsible for execution of this procedure for effectiveness.

## 6. REFERENCES


- 6.1. MERC Regulations (with its latest amendments)
- 6.2. Central Electricity Authority (Measures Relating to Safety & Electric Supply) Regulations 2010 (with its latest amendments)
- 6.3. OEM Manual
- 6.4. Guideline # TPD05-DIS01-GDL-001\_Guideline for HV Network Design

## 7. SPECIFIC COMPETENCY REQUIREMENTS

- 7.1. Tech/Jr.Exe/Exe/AM/M should have Knowledge of
  - (1) Operation of Feeders, Power Transformers, DTCs, Switchgears & Substation/switching station equipment
  - (2) Safe working practices and use of PPE
- 7.2. Tech/Jr.Exe/Exe/AM/M having valid authorization from General Manager Distribution shall have authority for electrical isolation and issue of Permit to Work (PTW).
- 7.3. As per competency profile and assessment.

## 8. INTERFACE WITH OTHER DEPARTMENTS/SECTIONS, IF ANY

- 8.1. Control Room/NPC for Outage and temporary switching Information before and after

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isolation

8.2. Safety Department for information of work execution

## 9. TOOLS AND TACKLES

- 9.1. Relevant pages of System Distribution Book (SDB)
- 9.2. HT live line detector, if required
- 9.3. Switchgear operating handles (of required make) as-and-when required
- 9.4. Earthing and shorting devices in required quantity
- 9.5. LOTO/Padlock
- 9.6. NTC

## 10. PERSONAL PROTECTIVE EQUIPMENTS / SAFETY TOOLS

Following PPEs shall be used to carry out work at site.

- 10.1. Safety shoes/ Gum Boot
- 10.2. Safety Helmets /full mask Helmet
- 10.3. 22kV Safety Gloves


## 11. SIGNIFICANT RISK PARAMETERS

- 11.1. Quality Management System: Low
- 11.2. Impact on Environment: Low
- 11.3. Health and Safety Risk: High
- 11.4. Energy Management: Low
- 11.5. Asset Management Risk: Medium

## 12. PROCEDURE

### 12.1. JOB PREPARATION

- (1) Confirm the purpose of Switching & execute in consultation with Control Room
  - (a) Isolation of Feeder Section
  - (b) Isolation of Substation / Substation equipment's
  - (c) Feeder Load Transfer with consultation with Control room
  - (d) Sectionalisation of faulty leg
  - (e) Normalisation of Feeder
  - (f) Normalisation of Substation / Substation equipments
- (2) Details of temporary switching if any if it is related to the feeder under shutdown/tripping.

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- (3) Receive message of tripped feeder from Control room
- (4) Confirm name of the feeder, peak load for the feeder and its connected feeder, flag on which feeder has tripped (in case of tripping), sub-feeder and section of feeder.
- (5) Load transfer/temporary switching of HT feeder in discussion/consultation with Control Room.
- (6) Check if any message of flashover, line fallen, fire etc. received from consumers, employees or any external agency/persons.
- (7) Check the feeder in SDB and plan out the activity of switching necessary for load transfer; details of both feeder in case of Planned Job (i.e. the feeder of which load is to be transferred and the feeder on which load is to be transferred considering its loading, weak links, size of conductor/cable, CT ratio, relay setting etc.).
- (8) Operation sequence to be discussed and decided by the Control Room In charge regarding priority to be given to load transfer and then isolation of the portion on which the job is to be carried out.
- (9) Control Room to maintain records

#### 12.2. PRECAUTIONS

- (1) Ensure switchgear gas level within limit before operation. For switchgears wherever gas pressure is low, site team to ask Control room to switch-off feeder or isolate far end of source side to operate the switchgear.
- (2) Do not allow any person near the switchgear other than the person who is operating during feeder trial
- (3) Use required PPEs during execution of the job.
- (4) If in case of cable damage due to any excavation work, during trial of that tripped feeder, ensures that no person is working in that excavation area to prevent any accident.
- (5) Where the provision of earthing is not available, after making SFU/MCCB “OFF”, the transformer, connected with the above SFU, is to be isolated from its LT side to ensure no back feed of power and local earthing is to be done on LT side of transformer through earth discharge rod/Short Links after confirming “NO Power” on LT terminals through Test lamp.
- (6) In case of DLs, disconnect all the three links. If any work is to be carried out on isolated section for longer duration, then jumpers for the same are required to be disconnected and removed else it should be manned to avoid accidental operation
- (7) In case of HT OH line feeders if feeders got tripped on over current or over load and earth fault both, take trial only after patrolling and no abnormality has been found.
- (8) In case of automated switchgear wherein remote operation is possible through SCADA:


- (a) Switching is to be carried out by control room.
- (b) While doing local operation, Selector switch is to be kept in local position in consultation with control room.
- (c) Other than that in normal condition the selector switch is to be kept in Remote mode.
- (9) Before/after isolation of the section ensure the substation supply status from DT meter/ local indication.
- (10) At each location where isolation has been carried out and in which provision is there for pad locking, provide pad locking having LOTO / Padlock & Put the NTC Sticker and mention the details as under.
- (11) Keep the NTC Sticker and mention the details as under
  - (a) Isolation carried out by Engineer Name/ Sign of Engineer
  - (b) Reason for Isolation.
  - (c) Date and Time of Isolation.
- (12) After isolation, ensure zero potential on equipment/power line where work is to be carried out using suitable device (like HV line detector)
- (13) Open all possible sources/ source links (DL, DO) & ensure applying earth in RMU, SAB switchgears sections where work is intended to be executed.
- (14) After confirmation of dead circuit/section/equipment, local discharge and shorting to be provided at work location prior to commencing work at site.

### 12.3. ISOLATION


- (1) Not applicable

### 12.4. WORK PROCEDURE

- (1) Isolation of feeder section
  - (a) Go to the far end substation of feeder section to be isolated.
    - I. Confirm and verify at far end isolating device position for incoming & outgoing cables /DL as per SDB.
    - II. If operation is possible through SCADA, inform Control room to switch "OFF" isolation device for respective substation. Authorized person has to put selector switch in local position.
    - III. Else switch "OFF" the isolator from substation as applicable as per Planned switching from its "ON" position.
    - IV. Provide LOTO/ Padlock and NTC.
  - (b) Go to the location from where load is to be transferred.
    - I. Confirm and verify isolating device position for incoming & outgoing cables/OH conductor /DL/ DO fuses as per SDB.


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- II. If operation is possible through SCADA, inform Control room to switch “ON” isolation device from respective substation.
- III. Else switch “ON” the isolator from substation as applicable as per Planned switching from its “OFF” position.
- (c) After load transfer, confirm from Control room whether feeder loading is within permissible limits.
- (d) If more than one far end, repeat the same sequence as above.
- (2) For Isolation of Cable segment
  - (a) “Switch OFF” Source side isolator / Breaker from Control Room / Substation
  - (b) “Switch OFF” Load side isolator from Control Room / Substation after load transfer
  - (c) “Earth” both end isolator of isolated cable segment
  - (d) Provide LOTO/ Padlock and NTC at both ends of isolator/breaker
  - (e) If cable is connected at OH Pole at either point, disconnect the jumper connected to OH Line / DL / DO / Pole Box. Cable to be lowered.
- (3) Switchgear Isolation
  - (a) “Switch OFF” Source side isolator / Breaker from Control Room / Substation
  - (b) “Switch OFF” all Load side isolator from Control Room / Substation after load transfer
  - (c) If Switchgear cable is connected at OH Pole at either point, disconnect the jumper connected to OH Line / DL / DO / Pole Box. ~~Cable to be lowered~~
  - (d) “Switch OFF” & “Earth” all far end isolators
  - (e) “Earth” all isolator of switchgear.
  - (f) Before Earthing ensure that the part VPIS is not High (i.e. feeder not be energized/reverse charged)
  - (g) Provide LOTO/ Padlock and NTC on switchgear parts & at all far ends
- (4) Breaker Isolation
  - (a) “Switch OFF” & “Earth” the breaker
  - (b) Ensures Isolation of HT consumer side breaker or HT terminations and provide LOTO/Padlock or NTC.
  - (c) After isolation, ensure zero potential on FSP bus-bar is to be carried out using suitable device (like Multimeter/Test lamp).
  - (d) In case of distribution SS/DTC ensure FSP switch is made OFF/ removed HRC link and NTC/Tag is provided on switch. Also provide shorting link on incoming of LT switch/bus-bar.

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- (5) DTC isolation
  - (a) Transformer Isolation
    - I. Ensure that the breaker is switched off & earthed in case of switchgear-controlled transformer.
    - II. In case of DO controlled transformer all three Drop out fuses are isolated and removed including switching off the LT switch/MCCB & Earthing and shorting to be provide at LT side.
    - III. After isolation, ensure zero potential on equipment where work is to be carried out using suitable device (like HV line detector / multi meter / test lamp etc.)
    - IV. LT Switch / breaker shall be switched OFF and in case of direct type FSP remove all fuses. Provide shorting link on incoming of LT switch/bus-bar.
    - V. Ensure shorting and earthing in FSP with hand gloves.
  - (b) FSP Isolation
    - I. Over and above ensure all out going circuit fuse is removed and tapping on LT out going cable
  - (c) AFPC Isolation
    - I. MCCB of APFC panel shall be switched off
    - II. Remove all HRC fuses from FSP to APFC outgoing circuit
    - III. After isolation, ensure zero potential at MCCB of APFC
- (6) Inform the Control room regarding isolation & load transfer wherever applicable.
- (7) Normalization
  - (a) Go back to the initial point of the isolated section where the job had been carried out.
    - I. Confirm that local earthing/ shorting has been removed and isolation device has been changed from its “EARTH” condition and kept in “OFF” condition.
    - II. Remove LOTO/ Padlock and NTC from far end.
    - III. Normalize switching in required sequence,
      - i. If operation is possible through SCADA, Authorized person has to put selector switch in remote position and inform Control room to switch “ON” isolation device for respective substation.
      - ii. Else switch “ON” the isolator from substation as applicable as per Planned switching from its “OFF” position.
  - (b) Go to the respective “OFF” point (cut point) location of the duplicate feeder on which part /full load has been transferred



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- I. Do switching as per the normalization temporary switching in required sequence. For switching operation from “ON” to “OFF” at respective location.
- (c) Go to the respective location of the feeder from where isolation has been made for transfer of part/ full load of the feeder.
  - I. Do switching as per the normalization temporary switching in required sequence. For switching operation from “OFF” to “ON” at respective location.
- (d) If cable is disconnected at OH Pole at either point, connect the jumper connected to OH Line / DL / DO / Pole Box.

#### 12.5. RESTORATION

- (1) Not Applicable

#### 12.6. WORK CHECKLIST

- (1) Not Applicable

#### 12.7. UPDATION

- (1) Inform the Control room to remove respective temporary switching/load transfer points and Cancel/Update the same in context with above operation
- (2) Update SDB for any change or permanent switching is done.


### 13. IMPACT ANALYSIS OF SIGNIFICANT RISKS

#### 13.1. QUALITY MANAGEMENT

- (1) Details of Quality Issues involved
  - (a) Incompetent manpower (Over Loading of feeders)
  - (b) Incompetent manpower (Wrong switching operation)
- (2) Details of Quality Assurance plan
  - (a) Follow OCP
  - (b) Ensure feeders are not overloaded
  - (c) Effective supervision
  - (d) Authorization

#### 13.2. HEALTH AND SAFETYMANAGEMENT

- (1) Details of Health and Safety Hazard involved
  - (a) Working/travelling in extreme weather condition
  - (b) Poor illumination
  - (c) Animal/ insect bite
  - (d) Flash Over during switching operation

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- (e) Working in congested area
- (f) Use of faulty Tools
- (g) Negligence of use of safety PPEs / Non usage of PPEs/ Use of faulty PPEs
- (h) Hit by handles/tools due to slippage/ mishandling
- (i) Working in unhygienic area
- (j) Consumer aggression
- (k) Contact with Live terminal/ cable/ wire/ busbar
- (l) Accident due to improper isolation
- (2) Health and Safety Precautions required
  - (a) Follow the OCP
  - (b) Ensure the PPEs in healthy condition & use all required PPEs during execution of the job
  - (c) Ensure the Tools & Tackles in working condition
  - (d) Ensure monitoring switchgear Gas/SF6 level by Control Room

### 13.3. ENVIRONMENTMANAGEMENT


- (1) Details of Environmental impact
  - (a) Resource Depletion
- (2) Precautions to minimize Environmental impact
  - (a) Consumption monitoring

### 13.4. ENERGY MANAGEMENT

- (1) Not Applicable

### 13.5. ASSET MANAGEMENT

- (1) Details of Asset related risks
  - (a) Loss of Equipments
  - (b) Frequent Small Duration Forced Outages
  - (c) Sustained Forced Outage requiring Major Repair
  - (d) Frequent Planned Outages
  - (e) Overloading of equipment
  - (f) Mishandling by handling equipment
  - (g) Derating
  - (h) Derating / Ageing

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- (i) Overloading of MCCB
- (j) Ageing/ Corrosion/ Rusting
- (2) Mitigation plan for asset related risks
  - (a) OCP & On Job Training
  - (b) Authorization

#### 14. LIST OF ATTACHMENTS

Sr	Document /Record Description	Reference No.
1	Guideline for 22/11KV HV Network Design	TPDF02-DIS01-GDL-001

\*\*\*\*\* End of Procedure \*\*\*\*\*