
	<b>Torrent Power Ltd. – Distribution Franchise</b>	Doc. No.: TPDF02-DIS01-OCP-009
	<b>OCP - ELECTRICAL MAINTENANCE OF DISTRIBUTION SUBSTATION</b>	Rev. No. /Dt: 00/ 01.12.2021

## DOCUMENT CONTROL


<b>Document Number</b>	<b>TPDF02-DIS01-OCP-009</b>	
<b>Title of Document</b>	<b>ELECTRICAL MAINTENANCE OF DISTRIBUTION SUBSTATION</b>	
Document owner:	General Manager (HV Cell)	
Prepared by / Modified by	Mr. Amit Magdum Manager HV Cell	07.11.2021
Reviewed by	Mr. Shilajit Ray Mr. Satish Shah Assistant General Manager HV Cell	22.11.2021
Approved by	Mr. Snehal Shah Mr. Abdulrashid Shaikh General Manager HV Cell	30.11.2021
Last Reviewed on		01.12.2022

The user of any printed copy of this controlled document is  
Responsible for verifying it is the current version prior to use

	<b>Torrent Power Ltd. – Distribution Franchise</b>	Doc. No.: TPDF02-DIS01-OCP-009
	<b>OCP - ELECTRICAL MAINTENANCE OF DISTRIBUTION SUBSTATION</b>	Rev. No. /Dt: 00/ 01.12.2021

**Amendment Details:**

Sr.	Issue No.	Rev. No.	Date	Amendment Details	Reviewed by	Approved by
1	1	0	01.12.2021	First Issue	Shilajit Ray Satish Shah	Snehal Shah Abdulrashid Shaikh
2	1	0	01.12.2022	First Review Done (No changes)	Shilajit Ray Satish Shah	Ankit Saha Abdulrashid Shaikh

	<b>Torrent Power Ltd. – Distribution Franchise</b>	Doc. No.: TPDF02-DIS01-OCP-009
	<b>OCP - ELECTRICAL MAINTENANCE OF DISTRIBUTION SUBSTATION</b>	Rev. No. /Dt: 00/ 01.12.2021

## 1. PURPOSE

- 1.1. Electrical maintenance of Distribution Substation

## 2. SCOPE OF DOCUMENT

- 2.1. The scope of this document is to define a structured activity-level flow for Electrical maintenance of Distribution Substation.
- 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 Electrical maintenance of Distribution Substation 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. Operating manual of OEM
- 6.4. Guideline # TPDF02-DIS01-GDL-001\_Guideline for HV Network Design
- 6.5. Guideline # TPDF02-DIS01-GDL-002\_Guideline for HV Asset Management
- 6.6. OCP # TPDF02-STO01-OCP-006 (Operational Control Procedure for Handling, Collection, Storage and Management of Hazardous Waste)

## 7. SPECIFIC COMPETENCY REQUIREMENTS

- 7.1. Technician/GET/Jr.Exe/Exe/AM/M should have Knowledge of
  - (1) O&M of Switching & Sub-station equipment
  - (2) Safe working practices and use of PPE
- 7.2. Technician/GET/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

	<b>Torrent Power Ltd. – Distribution Franchise</b>	Doc. No.: TPDF02-DIS01-OCP-009
	<b>OCP - ELECTRICAL MAINTENANCE OF DISTRIBUTION SUBSTATION</b>	Rev. No. /Dt: 00/ 01.12.2021

- 8.1. Control Room/ - for Outage and temporary switching Information
- 8.2. LV Cell, Civil department
- 8.3. Store for material issue and reconciliation
- 8.4. Call centre for information to the consumer

## **9. TOOLS AND TACKLES**

- 9.1. Tool kit
- 9.2. Digital Clamp on meter.
- 9.3. Ladder if required
- 9.4. Operating Handle of the switchgear of required make (if required)
- 9.5. Oil Pump and pipe (if required)
- 9.6. Bucket and empty oil drum (if required)
- 9.7. Test Lamp
- 9.8. Live Line Detector
- 9.9. Discharge Rod / Shorting link
- 9.10. DO operating Rod (if required)
- 9.11. Torch (if required)
- 9.12. Testing kits (if required)


## **10. PERSONAL PROTECTIVE EQUIPMENTS / SAFETY TOOLS**

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

- 10.1. Safety Shoes
- 10.2. Safety helmets / helmet with face visor
- 10.3. Insulating rubber hand gloves of 22KV
- 10.4. FRP grating for PMT if required
- 10.5. Barricading tape (if required)
- 10.6. Caution board / “Men at work” sign board (if required)
- 10.7. Barricading cone (if required)
- 10.8. Safety Jackets

## **11. SIGNIFICANT RISK PARAMETRS**

- 11.1. Quality Management System: Low
- 11.2. Impact on Environment: High
- 11.3. Health and Safety Risk: High

	<b>Torrent Power Ltd. – Distribution Franchise</b>	Doc. No.: TPDF02-DIS01-OCP-009
	<b>OCP - ELECTRICAL MAINTENANCE OF DISTRIBUTION SUBSTATION</b>	Rev. No. /Dt: 00/ 01.12.2021

11.4. Energy Management: Low

11.5. Asset Management Risk: High


## 12. PROCEDURE

### 12.1. JOB PREPARATION

- (1) Prepare Maintenance activity as per asset patrolling/survey report, Complaint from NPC or Other department.
- (2) Check the necessary data and aforesaid report regarding network, distribution transformer, switch gear etc.
- (3) Ensure and provide for illumination in sub-station if require.
- (4) Communicate with Control Room / LV Cell regarding Maintenance of Substation scheduled & related feeder status.
- (5) Issue of necessary materials.
- (6) Transport manpower, materials, tools and tackles to site.

### 12.2. PRECAUTIONS

- (1) Working area should be free from slippery material to prevent slipping.
- (2) At each location where isolation has been carried out and in which provision is there for pad locking, provide pad locking having LOTO/Padlock.
- (3) Ensure that the breaker is switched off & earthed in case of switchgear-controlled transformer. 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.
- (4) If isolation is not done, do isolation as under as per the site / system requirement.
  - (a) Rack out the breaker trolley of breaker up to the 'isolation position' or switch OFF HT breaker and put in earth position. If earthing is not possible, ensure air isolation immediate downstream.
  - (b) If LT Switch / breaker then ensure that 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. Put NTC Sticker.
- (5) Earthing of busbar to be carried NTC sticker and mention the details as under
  - (a) Reason for Isolation.
  - (b) Date and Time of Isolation.
  - (c) Isolation carried out by Engineer Name / Sign of Engineer.
  - (d) Mobile no. of engineer
- (6) 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.)
- (7) Instruct to allocated person that do not touch / operate any equipment of substation

	<b>Torrent Power Ltd. – Distribution Franchise</b>	Doc. No.: TPDF02-DIS01-OCP-009
	<b>OCP - ELECTRICAL MAINTENANCE OF DISTRIBUTION SUBSTATION</b>	Rev. No. /Dt: 00/ 01.12.2021

before getting “Permit to Work” from supervisor


- |  |
|--|
| <ul style="list-style-type: none"> <li>(8) Ensure shorting and earthing in FSP with hand gloves.</li> <li>(9) Handling of automated RMU sealed (VRLA) battery: <ul style="list-style-type: none"> <li>(a) Ensure that battery terminals are isolated to prevent short circuit / explosion of battery.</li> <li>(b) Handle the battery with care during the transit and storage to prevent against any physical damage to battery and human body injury.</li> </ul> </li> </ul> |
|--|

### 12.3. ISOLATION


- (1) For isolation equipment from the system follows the procedure as per OCP No: TPDF02-DIS01-OCP-005 for Distribution Network Isolation and Normalisation as per the switching requirement.
- (2) Authorised person issue “Permit to work” as applicable to competent person after required isolation and local earthing.

### 12.4. WORK PROCEDURE

- (1) The workman should be aware regarding Electrical maintenance of Substation.
- (2) Clean switchgears, transformer and related equipments.
- (3) Inspection and maintenance of switchgear (Gas filled)
  - (a) Visual inspection at least once in a year & for frequent operating switchgears at least twice in a year
  - (b) Inspect various parts of Switch Gear
  - (c) Inspect Bushings, Mechanism, HT cable box, HT cable, HT cable termination, Gas Level, Indicators, interlocks, Earthing line & termination.
  - (d) Check ON-OFF-EARTH operation.
  - (e) Clean the outer parts of the Switch Gear
  - (f) Take Breaker Operation (Open & Close) time test.
    - (i) Mean Opening time at Nominal Voltage: 48ms
    - (ii) Mean Closing time at nominal Voltage: 65ms
  - (g) Take Contact Resistance Measurement Values of each Phase.
  - (h) Take insulation resistance value.
  - (i) For SCADA Enabled Switchgear
    - REMOTE Operation Test from SCADA.
    - All Digital Input/Output point to be checked.
    - All measurement values to be verified from SCADA.


	<b>Torrent Power Ltd. – Distribution Franchise</b>	Doc. No.: TPDF02-DIS01-OCP-009
	<b>OCP - ELECTRICAL MAINTENANCE OF DISTRIBUTION SUBSTATION</b>	Rev. No. /Dt: 00/ 01.12.2021

- (j) If problem of switchgear is not possible to attend on site, then replacement of the switchgear shall be initiated. Refer OCP No: TPDF02-DIS01-OCP-011 for Switchgear Replacement
  - (k) Attending Mechanism problem in Switchgear
- (4) Inspection and maintenance of GOD and DO fuse assembly
  - (a) Inspection and cleaning of GOD male/female contact.
  - (b) Check alignment of operating mechanism/ handle of GOD
  - (c) Checking of top and bottom contacts of DO fuse carrier.
  - (d) Checking of contact of DO carrier and availability of DO carrier.
  - (e) Checking of DO fuse current rating and shall be as per DT rating.
- (5) Inspection & maintenance of HT Capacitor Bank
  - (a) All Capacitor banks should be inspected, and electrical measurement including capacitance be made once in a year.
  - (b) After a Capacitor bank is de-energized, there will be residual charges in the units. So, wait for at least 5 min before approaching it to allow enough time for the internal discharge resistor in each capacitor unit to dissipate the stored energy.
  - (c) Grounding leads should be applied to all three phases to short out and ground the capacitor.
  - (d) Bulged Capacitor units should be handled carefully.
  - (e) Very proper mechanical assembly of capacitor units.
  - (f) Check the electrical connections for proper installation and verify that all the terminal connections are tightened properly.
  - (g) Clean all insulators, fuses, and bushings.
  - (h) Inspect all insulators for cracks and breaks.
  - (i) Test the operation of controls and load break, and grounding switches prior to energizing the capacitor banks.
  - (j) Immediately after energization, verify the voltage increase on the terminals.
  - (k) When returning to service, verify all the ground connections that were installed for maintenance purpose are removed.
- (6) Inspection & maintenance of Distribution Transformer.
  - (a) Inspect the various parts of distribution transformer like oil sealing gaskets, HT/LT cable, HT/LT termination, HT/LT bushings, HT/LT Box / Canopy, indicators, Earthing, Breather and Silica gel.
  - (b) If required replace the breather / silica gel and oil sealing gaskets.
  - (c) Wherever missing/damaged, provide earthing

	<b>Torrent Power Ltd. – Distribution Franchise</b>	Doc. No.: TPDF02-DIS01-OCP-009
	<b>OCP - ELECTRICAL MAINTENANCE OF DISTRIBUTION SUBSTATION</b>	Rev. No. /Dt: 00/ 01.12.2021

- (d) If any cable connection is not covered with HT tape or boots or any HT /LT cable lead or lug burnt out in HT/LT terminals, then rectify the problem.
  - (e) Top up the oil wherever required.
  - (f) Tightening of nut bolts if required.
  - (g) If oil leakage is observed, then attend the oil leakage. Refer the OCP No: TPDF02-DIS01-OCP-014 for Attending Oil Leakage of Distribution Transformer.
- (7) Replacement of faulty Lightning Arrester (LA)
  - (a) Type of LA to be used.
    - I. If LA is to be installed on DTs near to EHV substation from which feeder is being emanated substation class LA to be used.
    - II. If LA to be installed on DTs at some other location, Line class LA to be used.
  - (b) Installation of LA.
    - I. Provide the holes on top double pole channel fittings such that Lightning arrester can be mounted & clamped properly on the top of above channel fitting.
    - II. By means of hand lines lift the LA and mount them on top of the top channel fittings.
    - III. Base of the LAs to be given common earth connection by means of running the 25mm X 3mm Hot Dip GI strip and connecting the same with base of LA.
    - IV. For LA to DO Jumper.
      - i. LA to be connected on DO with XLPE insulated 0.06 sq mm insulated conductor of required length by crimping lug on one end & same is to be connected on LA.
      - ii. The other end of the jumper is to be connected on DO unit by means of crimping lug on both ends i.e. for DO as well as LA side.
    - V. Earthing of LA.
      - i. Follow the procedure as per OCP No: TPDF02-DIS01-OCP-012.
- (8) Maintenance of FSP
  - (a) Inspect the various parts of FSP like physical condition of LT cables, LT Switch/MCCBs, terminations and Earthing.
  - (b) In case of L type FSP, replace burnt fuse base.
  - (c) Replace damaged/burnt items wherever required.
  - (d) Attend Incoming LT cable if required.
  - (e) Check the tightness after connection.
- (9) Maintenance of LT Cable



	<b>Torrent Power Ltd. – Distribution Franchise</b>	Doc. No.: TPDF02-DIS01-OCP-009
	<b>OCP - ELECTRICAL MAINTENANCE OF DISTRIBUTION SUBSTATION</b>	Rev. No. /Dt: 00/ 01.12.2021


- (a) Check the termination of LT Cables on both the sides i.e transformer LT side & FSP incomer side.
- (b) Attend the LT cable if required.
- (c) Check the tightness after connection.
- (d) If required than replace with new LT Cables. Refer OCP No: TPDF02-DIS01-OCP-011 for Installation & replacement of Sub-station equipments.

**(10) Masonry Work**


- (a) Bricks required for masonry shall be thoroughly wetted with clean water for about two hours before use.
- (b) Proportion of cement mortar shall be 1:5 or specify for type of brick masonry.
- (c) Bricks shall be laid in English bond unless directed otherwise.
- (d) Half or cut bricks shall not be used except when necessary to complete to bond. In such cases it is required to cut in required size & to be used near the ends of walls
- (e) A layer of mortar shall be spread on full width for suitable length of the lower course
- (f) The wall shall be taken up truly in plumb. All courses shall be laid truly horizontal, and all vertical joints shall be truly vertical. Vertical joints in alternate course shall generally be directly one over the other. The thickness of the brick course shall be kept uniform.
- (g) The bricks shall be laid with frog upwards.
- (h) The surface over which brickwork to be carried out shall be cleaned before laying of mortar.
- (i) Thickness of the joint shall not exceed 12mm. The face joints shall be raked out as directed by raking tool daily during the progress of work, when the mortar is still green so as to provide key for plaster or pointing to be done.
- (j) Minimum cement consumption for masonry work shall be 70.00 Kg/ CMt
- (k) The consumption of cement shall be as per technical specification or as directed by Engineer-in-Charge.

**(11) Plastering Work**

- (a) Plastering shall be started from the top and worked down towards the floor.
- (b) All putlog holes shall be properly filled in advance of the plastering as the scaffolding is being taken down.
- (c) Wire mesh (Chicken mesh jail) to be provided along the joint of RCC and Masonry work having width of @ 300mm throughout the length of joint.
- (d) To ensure even thickness and a true surface, plaster about 15 × 15 cm shall be first applied, horizontally and vertically, at not more than 2 metres intervals over the entire surface to serve as gauges.

	<b>Torrent Power Ltd. – Distribution Franchise</b>	Doc. No.: TPDF02-DIS01-OCP-009
	<b>OCP - ELECTRICAL MAINTENANCE OF DISTRIBUTION SUBSTATION</b>	Rev. No. /Dt: 00/ 01.12.2021


- (e) The surfaces of these gauged areas shall be truly in the plane of the finished plaster surface. The mortar shall then be laid on the wall, between the gauges with trowel and level Patti.
- (f) The cement mortar (1:4) shall be applied in a uniform surface slightly more than the specified thickness. This shall be brought to a true surface, by working a wooden straight edge reaching across the gauges, with small upward and sideways movements at a time.
- (g) Finally, the surface shall be finished off true with trowel or wooden float according as a smooth or a sandy granular texture is required.
- (h) Excessive Trowelling or over working the float shall be avoided.
- (i) All corners, arises, angles and junctions shall be truly vertical or horizontal as the case may be and shall be carefully finished.
- (j) Rounding or chamfering corners, arises, provision of grooves at junctions etc. where required shall be carried out with proper templates or battens to the sizes required.
- (k) When suspending work at the end of the day, the plaster shall be left, cut clean to line both horizontally and vertically.
- (l) When recommencing the plastering, the edge of the old work shall be scrapped cleaned and wetted with cement slurry before plaster is applied to the adjacent areas, to enable the two to properly join together.
- (m) Plastering work shall be closed at the end of the day on the body of wall and not nearer than 15 cm to any corners or arises. It shall not be closed on the body of the features such as plasters, bands and cornices, nor at the corners of arises.
- (n) Horizontal joints in plaster work shall not also occur on parapet tops and copings as these invariably lead to leakages.
- (o) The plastering and finishing shall be completed within half an hour of adding water to the dry mortar.
- (p) Curing shall be started as soon as the plaster has hardened sufficiently not to be damaged when watered. The plaster shall be kept wet for a period of at least 7 days.
- (q) Minimum cement consumption for plaster work shall be 6.50, 9.50 & 10.00 Kg/ SMt for single coat, double coat and sand faced plaster respectively.
- (r) The consumption of cement shall be as per technical specification or as directed by Engineer-in-Charge.
- (12) Oil Paint on Metal Surface
  - (a) The number of coats shall be as stipulated in the item.
  - (b) Primer Coat: One coat of the approved quality anti-corrosive red-oxide shall be applied and allowed to dry overnight. It shall be rubbed next day with the finest grade of wet abrasive paper to ensure a smooth and even surface, free from brush marks and all loose particles dusted off.

	<b>Torrent Power Ltd. – Distribution Franchise</b>	Doc. No.: TPDF02-DIS01-OCP-009
	<b>OCP - ELECTRICAL MAINTENANCE OF DISTRIBUTION SUBSTATION</b>	Rev. No. /Dt: 00/ 01.12.2021

- (c) Top coats of synthetic enamel Paint of desired shade shall be applied after the red-oxide is thoroughly dry.
- (d) Additional finishing coats shall be applied if found necessary to ensure. Properly uniform glossy surface.

(13) Fabrication Work


- (a) All holes to be drilled shall be marked on members and drilled after proper checking. If necessary, a template shall be made for this.
- (b) All welding shall be done with appropriate method considering nature of job.
- (c) Welding electrode shall be heavily coated type designed for all position.
- (d) The size, type and manufacturer of electrodes shall be subjected to approval of Engineer.
- (e) Electrode and welding work shall be as per IS standard.
- (f) If desired, test shall have to be carried out for welded joints.
- (g) Suitable method should be used for cutting, considering condition of material and section of material using following method.
- (h) Using hex saw blade
- (i) Using mechanical cutter
- (j) Using gas cutter etc.
- (k) All the cutting and needed surface shall be properly grinding with electric grinder
- (l) Fabricated members shall be joined either by wilding or by rivets or nut and bolt arrangement as specified or shown on drawing or instructed.
- (m) One assemblies shall be got approved for alignment, riveting, wilding, etc.
- (n) For bolted joints necessary washers shall be provided as shown in the drawing or as instructed on site.
- (o) Erection of the structure shall be done by approved method.
- (p) Contractor shall provide necessary derricks, gantry, scaffolding and staging, inflammable etc. for erection work.
- (q) No gas cutting shall be allowed for the widening of holes when it is not matching. It shall be drilled.
- (r) Care shall be taken to see that no damage is done to the members during transportation of fabricated/assembled structure.
- (s) Paint should be provided to the structure.
- (t) Paint to be applied shall be got approved for brand, quality, tint etc.
- (u) Fabricated structure shall be given one shop coat of red oxide.

	<b>Torrent Power Ltd. – Distribution Franchise</b>	Doc. No.: TPDF02-DIS01-OCP-009
	<b>OCP - ELECTRICAL MAINTENANCE OF DISTRIBUTION SUBSTATION</b>	Rev. No. /Dt: 00/ 01.12.2021

- (v) After erection of structure 2 coats of approved oil painting should be provided to the structure
- (w) Additional precaution should be taken while cutting of plate. Only profile cutting is allowed in case of Chequered Plate while making Cable Trench Covers.
- (14) Chain link/Barbed wire/ Concertina Coil Fixing
  - (a) Drilling / Welding / Cutting / Painting procedure for supporting angles and flats for chain link /barbed wire / Concertina coil fixing remains same as above Support angle/flats should be grouted in concrete. Grouting should be enough to carry out designed load.
  - (b) Supports should be in line, level and plumb and of same size and dimensions.
  - (c) Chain link jail should be fixed using GI bolts with support tightly. Additional flats should be used to fix chain link jail at all four sides of frame.
  - (d) Joints shall be aligned at the supports and an overlap of minimum 300 mm shall be given where chain link jail ends.
  - (e) Concertina coil should be stretched as per the specification or direction of officer in charge.
  - (f) Concertina coil and barbed wire should be fixed with support tightly using GI wire.
- (15) Ensure correct CT Ratio, HT Fuse rating and Relay Setting as applicable.
- (16) After completion of work, ensure that Meter box, FSP panel & substation fencing/door is properly closed/locked.
- (17) Site housekeeping (wherever applicable)
  - (a) After completion of work remove all packing, waste material and dump in appropriate place.
  - (b) Remove barricades, temporary stakes etc.
  - (c) Clean the area of dirt, loose soil etc. wherever required
  - (d) Collect all hazardous waste like oil-soaked cotton waste, gaskets, waste oil etc. in containment tray at site & deposited to Stores.
  - (e) Collect all non-hazardous waste from site except masonry related waste (which shall be suitably crushed for local land use) & deposited to Stores.
  - (f) Remove temporary caution boards, plastic cones etc. if required

#### 12.5. RESTORATION

- (1) Remove shorting & earthing link from HT as well as from LT side. Remove LOTO / Padlock and caution board from respective location.
- (2) Take clearance from PTW/LCP issuing authority and/or site supervisor designated for the said job and Cancel "Permit to work".
- (3) Shift all the manpower and tools and tackles from the site.

	<b>Torrent Power Ltd. – Distribution Franchise</b>	Doc. No.: TPDF02-DIS01-OCP-009
	<b>OCP - ELECTRICAL MAINTENANCE OF DISTRIBUTION SUBSTATION</b>	Rev. No. /Dt: 00/ 01.12.2021

- (4) Remove excess material & scrap from the job area.
- (5) For normalisation of above switching coordinate with Control Room & follow the procedure as per OCP No: TPDF02-DIS01-OCP-005 for Distribution Network Isolation and Normalisation.
- (6) Check power available on FSP/DT Meter
- (7) Inform Control room regarding normalisation of section.
- (8) Remove the temporary switching from the control room giving all relevant details.

#### 12.6. **WORK CHECKLIST**

- (1) Ensure Quality Check entries in SAP or Field Force Application

#### 12.7. **UPDATION**

- (1) Update in GIS / SAP, if applicable.


### 13. **IMPACT ANALYSIS OF SIGNIFICANT RISKS**

#### 13.1. **QUALITY MANAGEMENT SYSTEM**

- (1) Details of Quality Issues involved
  - (a) Incompetent manpower (Wrong / Improper installation of accessories/equipment of substation)
  - (b) Incompetent manpower (Rework)
  - (c) Work not done as per OCP
- (2) Details of Quality Assurance plan
  - (a) Effective supervision
  - (b) Approved Vendor
  - (c) Penalty mechanism
  - (d) Follow OCP

#### 13.2. **HEALTH AND SAFETY**


- (1) Details of Health and Safety Hazard involved
  - (a) Contact with Live terminal/ cable/ wire/ busbar
  - (b) Flash Over during switching operation
  - (c) Hit by handles/tools due to slippage/ mishandling
  - (d) Contact with sharp edges
  - (e) Accident due to improper isolation
  - (f) Person working at site without TPL supervision
  - (g) working/travelling in extreme weather condition

	<b>Torrent Power Ltd. – Distribution Franchise</b>	Doc. No.: TPDF02-DIS01-OCP-009
	<b>OCP - ELECTRICAL MAINTENANCE OF DISTRIBUTION SUBSTATION</b>	Rev. No. /Dt: 00/ 01.12.2021

- (h) Electric shock due to improper earthing of welding / Other electrical tools
- (i) Animal/ insect bite
- (j) Negligence of use of safety PPEs / Non usage of PPEs/ Use of faulty PPEs
- (k) Working in bending position / Awkward Posture
- (l) injury due to welding work
- (m) Slips, trips and Falls of Persons
- (n) Working in unhygienic area
- (o) Fall of external object
- (p) Use of faulty Tools
- (q) Working in congested area
- (r) Fall of person from Height
- (s) Skin contact with oil
- (t) Consumer aggression
- (u) Fire in distribution Transformer
- (v) Contact with Partially charged capacitor
- (w) Poor illumination
- (2) Health and Safety Precautions required
  - (a) Regular housekeeping practices
  - (b) Use of proper PPEs
  - (c) If applicable, keep the fire extinguisher ready within reachable limit
  - (d) Authorisation

### 13.3. ENVIRONMENT

- (1) Details of Environmental impact
  - (a) Land Contamination
  - (b) Resource depletion
  - (c) Land pollution
- (2) Precautions to minimize Environmental impact
  - (a) Material consumption Monitoring
  - (b) Material Reconciliation
  - (c) Used oil to be collected in empty barrels and provide identification tag and submit to the store.

	<b>Torrent Power Ltd. – Distribution Franchise</b>	Doc. No.: TPDF02-DIS01-OCP-009
	<b>OCP - ELECTRICAL MAINTENANCE OF DISTRIBUTION SUBSTATION</b>	Rev. No. /Dt: 00/ 01.12.2021

- (d) Ensure that all type of generated waste including hazardous waste like oil-soaked cotton waste, gaskets, waste oil should be collected in containment tray and submitted to stores as per OCP no: TPDF02-STO01-OCP-006.

#### 13.4. ENERGY MANAGEMENT

- (1) Details of energy use involved
  - (a) Fuel consumption in transportation/ material movement
- (2) Precautions to minimise energy use
  - (a) Ensure Optimum Usage & Turn off the engine when not in use

#### 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
  - (i) Overloading of MCCB
  - (j) Ageing/ Corrosion/ Rusting
- (2) Mitigation plan for asset related risks
  - (a) Work as per OCP and checklist
  - (b) Training to workforce
  - (c) Authorisation

#### 14. LIST OF ATTACHMENTS

Sr	Document /Record Description	Reference No.
1.	Distribution substation inspection report	TPDF02-DIS01-CHK-001-F04
2.	Routine Switchgear Maintenance Check list	TPDF02-DIS01-OCP-009-F01
3.	Permit To Work	TPDF02-SAQ02-OCP-005

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