

**NATIONAL ELECTRIC POWER REGULATORY
AUTHORITY**

(NEPRA)



GUIDELINES FOR

**POWER SAFETY CODE
FOR
TRANSMISSION & DISTRIBUTION
LICENSEES**

**First Edition
November, 2014**

POWER SAFETY CODE

TABLE OF CONTENTS

Sr #	Code	Description	Page
1	PSC-1	Purpose	1
2	PSC-2	General Instructions of Power Safety	1
3	PSC- 3	Non-Compliance of Safety Code	3
4	PSC- 4	Responsibilities & Duties of Safety Management Team from Power Safety Point of View	3
5	PSC- 5	Implementation of Safety Manual	4
6	PSC- 6	Detailed Instructions of Power Safety to be considered while preparing the Power Safety Manual.	4
	PSC- 6.1	Purpose, Scope & Philosophy of Safety Policy	4
	PSC- 6.2	Basic Safety Guidelines	5
	PSC- 6.3	General Provisions for Safety	7
	PSC- 6.4	Safety Policy for Electrical Equipments & Materials from Design & Execution Point Of view	8
	PSC-6.5	Safety Measures from Operation & Maintenance Point of View	9
	A.	General Safety Requirements	9
	B.	Safety Precautions for work on or near High Voltage Systems	9
	C:	Procedures for work on particular items of plant, Apparatus or conductors.	11
	D:	Safety Precautions for High Voltage Live Line work on High Voltage Over Head lines.	12
	E:	Safety Precautions for the Testing of High Voltage Systems.	13

Sr #	Code	Description	Page
		F: Safety Precautions and procedures applicable to Low Voltage Systems.	13
	PSC- 6.6	Safety for Power Plants	14
	PSC- 6.7	Safety Policy for Transportation	14
	PSC- 6.8	First Aid Procedures	15
	PSC- 6.9	Resuscitation & Rescue Procedures	16
	PSC- 6.10	Data Base of Power Safety and Operation & Charts	16
8	PSC- 7	Glossary of Terms used in Power Safety Manual	17

POWER SAFETY CODE

PSC-1 Purpose

The purpose of this safety code is to ensure that the licensee's networks are planned, developed, operated and maintained in an efficient & safe way without compromising on safety of any kind related to the systems, personnel & others.

In this Power Safety Code, guidelines/instructions have been provided in each section with sufficient details. On the basis of this Safety Code, a Safety Manual shall be prepared by each licensee depending upon its own requirements and shall be approved by NEPRA.

{Similarly a safety manual shall be prepared by other users of the transmission & distribution system & approved by Licensee when carrying out works or tests at the operational interface with the licensee.}

PSC-2 General Instructions of Power Safety

- The licensee shall abide by the safety requirements as set out in Power Safety Code, Distribution Code, Power Safety Manual, Performance Standards (Distribution) Rules -2005, Grid Code & other applicable documents.
- The licensee shall promote a healthy & safe culture and provide all employees, contractors, and the people concerned and the public with a safe & healthy place to work. The Licensee shall ensure that Safe working is integrated into every aspect and area of business. Moreover safety culture shall be based on personal leadership, collaboration and involvement.
- The licensee shall adhere to the highest standards in all work practices so as to ensure protection of employees & any other affected by what licensee do. Each Licensee shall ensure in day to day work that

Facilities /support programmers are provided to safe guard the health, welfare & well being of their staff.

- The licensee shall foster openness and dialogue, and be open to the concerns of employees, contractors and other concerned. It shall also be ensured that Safety Standards and policies are known, understood and implemented/applied.
- The licensee shall treat all injuries, occupational illnesses & safety incidents as preventable & set out goals for all of them as zero. Each licensee shall make necessary arrangements for accurately reporting all unsafe incidents in a timely manner to all concerned & CEO/Head of organization also, and shall encourage near miss reporting.
- The licensee shall ensure investigation of unsafe incidents/near misses, to communicate what Licensee learn widely not to make the same mistake twice.
- The licensee shall ensure compliance with these commitments.
- The licensee shall ensure audit commitment to safety to demonstrate adherence is everywhere and by everyone.
- The licensee shall ensure reorganization of training in awareness of and application of best safety practices, ensure their availability and use.
- The licensee shall ensure, Activeness in communicating safety policy to contractors, visitors, customers & communities where Licensees have operations.
- The licensee shall ensure that the safety policy statements setout the respective responsibilities of Licensee personnel for health and safety policy, systems procedures and their implementation and for monitoring and auditing the effectiveness of the policy statements.
- The licensee shall ensure that the policy statement are reviewed annually by review panel and amended to reflect changes in the organization or statutory requirements.

- The licensee shall ensure compliance with relevant laws & regulations & take any additional measures considered necessary.

PSC- 3 Non-Compliance of Safety Code

Any act of non-compliance of any of the provisions of this Safety Code by any of the user or entity shall be subject to penalties as per Authority Fees & Fines Rules 2002. Provided however, no such penalties shall be imposed for non-compliance with the provisions of this Code up-to two years from the date of approval thereof by Authority.

PSC- 4 Responsibilities & Duties of Safety Management Team from Power Safety Point of View

The power safety management team shall be independent in all its functions under the direct control of chief executive officer of each DISCO/Head of the licensee. Responsibilities & duties of safety management team from power safety point of view shall be clearly defined from all respective point of view as mentioned below.

- Responsibilities for preparation of power safety manual
- Responsibilities for implementation of power safety manual
- Responsibilities for Compliance of safety procedures/manuals
- Auditing of safety procedures/manuals
- Responsibilities for reporting for non compliance
- Responsibilities for suggested measures for preventive Actions
- Responsibilities for maintenance of all relevant record & onward submission to NEPRA.

PSC- 5 Implementation of Safety Manual

Each Licensee shall ensure implementation of safety manual by means of :-

- a) Equipment
 Through high engineering and maintenance standards, so that the equipment is fit for purpose.
- b) Procedures
 Through locally prepared, documented procedures and/or other systems
- c) People
 Through training, involvement and other programmes to help people contribute to safety, security, health and environment

PSC- 6 Detailed Instructions of Power Safety to be considered while preparing the Power Safety Manual**PSC-6.1 Purpose, Scope & Philosophy of Safety Policy**

Each licensee shall elaborate the purpose & scope of overall safety policy, vision of the licensee about safety, fundamentals of the power safety and the issuance of power safety manual to all concerns.

Duties & responsibilities of safety team/safety directorate & others regarding training, record, implementation, auditing and preventive action shall be clearly defined by each Licensee. The Licensee shall provide such records to NEPRA as and when required.

PSC-6.2 Basic Safety Guidelines

The licensee shall provide the basic safety guidelines primarily for persons who have not been appointed as competent persons under power safety code or persons who work beyond their scope of competence.

The basic safety guidelines shall comprise but not limited to the following:-

- General Principals
- Operations
- Fire Precautions & work in confined space
- Work in Substations & Compounds

The general basic principles of safety shall also be observed i.e:-

- Identification of Hazards
- Elimination of Hazards
- Controlling of Hazards
- Protection against injuries
- Minimizing the severity of injury
- Avoiding for future occurrences

Unsafe conditions or unsafe acts shall be clearly defined, as the good operation is only the safe operation.

Examples of un-safe conditions be clarified i.e,

- Improper Guarding
- Defective material or equipment
- Hazardous arrangements

- Insufficient lighting
- Improper ventilation
- Unsafe Clothing
- Unsafe Design & Construction

Examples of Un-Acts be clarified i.e:-

- Operating without Authority or Warning
- Operating or Working at unsafe Speed
- Making safety devices In-operative
- Use of unsafe equipment or improper use of equipment
- Unsafe Loading
- Placing or Leaving Objects
- Mixing improper Packing
- Taking unsafe Position or Posture
- Working on equipment without taking proper precautions
- Distracting, Teasing or Startling
- Failure to use safe clothing or protective equipment

From operation point of view, other factors be also considered i.e :-

- Shift Duties
- Reporting of duty in unfit condition
- Assistance from employees not on duty
- Inspection of Grid Station Equipment
- Weather information
- Interference of animals
- Visitors
- Working of employees of other organizations
- Identification of operating equipment

PSC-6.3 General Provisions for Safety

The general provisions of safety shall be provided by each licensee covering the followings:-

- The provisions for workers /operators to object to doing work on safety grounds.
- The use & wearing of safety equipment & protective clothing.
- Physical fitness & personal conduct of the worker before and during on job
- Arrangement and procedure of job briefing before the work is started
- Requirements to safe guard the public and property when work in progress
- Requirements for house keeping in a safe working in conditions
- Arrangements and requirements of Fire protection
- Requirements, arrangements and use of proper tools and plants for the proper and safe storage lifting and carrying of different types of material
- Procedure and reporting requirements of patrolling of lines
- Procedure for tree trimming
- List of common protective devices and equipments use for the safety purposes.

PSC-6.4 Safety Policy for Electrical Equipments & Materials from Design & Execution Point Of view

Each Licensee shall establish the design section, which shall be responsible for complete detailed engineering design and execution of electrical equipments and materials from power safety point of view. All design aspects/design criteria shall be provided to NEPRA as & when required and complete record shall be maintained by each Licensee.

Detail regarding improvement in existing electrical protective equipments shall be clearly provided i.e :-

- Protective measures as per IEC or international engineering standards in 11KV Panels in order to diagnose the fault in case the live conductor falls on rocks or any dry surface and in result may cause damage to people or property.
- Protection of Transformers
- Protection of 11KV lines with protective devices
- Protection of cables against fires, as in some instances cable may become a carrier of fire.

PSC-6.5 Safety Measures from Operation & Maintenance Point of View

Safety measures for operation & maintenance shall cover but not limited to the following:-

A. General Safety Requirements

- Access to and work in operational premises, underground chambers & confined spaces
- Working with vessels that contain oil or flammable liquids.
- Access to & work in fire protected areas.
- Climbing of Poles, towers & structures
- Access to high voltage apparatus and structures
- Arrangements for high voltage switching operations
- The use of voltage testing devices
- The procedure to follow when excavating near live cables.
- The use of mobile plant and equipment near overhead lines.

B. Safety Precautions for work on or near High Voltage Systems

- This section includes the all precautionary measures and procedures to be followed while working on or near any high voltage system;
- The general safety principles to follow to ensure safe working

- The arrangements for insuring safe isolation if apparatus and conductors
- The methods to be used to discharge and earth high voltage equipments
- The procedure to follow when approaching live high voltage conductor and insulators supporting them.
- The procedure to follow for work in substation and switching substations containing exposed live high voltage conductors
- Permits to Work
- Sanctions for Tests
- Limitations of Access

For Permit to work (PTW), specimen shall be provided by each DISCO/NTDC in the safety manual covering the following but not limited to the following:-

- Application of PTW
- Issuance of PTW
- Receipt of PTW
- Clearance of PTW
- Cancellation of PTW

For sanction of test & the limited work certificate the following points must be considered:-

- Preparation
- Issues and receipt
- Transfer
- Clearness and cancellation

Requirement:- Each Licensee shall provide the PTWs with the minimum details as mentioned above.

C: Procedures for work on particular items of plant, Apparatus or Conductors

Each licensee shall cover operations which require procedures to be followed which are additional to the general ones.

- General safety precautions to be taken for use of cleaning solvents, Handling of toxic or hazardous materials, Glass fiber thermal insulation, Explosives, radio actives and radiations, High voltage testing, leak checking, pressure vessels/cylinders, underground man-holes.
- Procedures for safe working of remotely and automatically control equipment shall be established by each DISCO/NTDC after consultation with NPCC or RCC which ever case is applicable & shall be provided in power safety manual.
- With-drawable apparatus
- Bus-bars, bus-bar spouts and bus-bar connections of multiple panel /switchboards
- High voltage apparatus and plant operated by or containing compressed air with other gases or operated by hydraulic power
- Transformers
- High voltage static capacitors
- High voltage cables
The type & classification of cables along with voltage rating shall be clearly defined by each DISCO/NTDC
- High voltage over head lines

- Single or multiple circuit, high voltage over head lines, with all conductors dead
- Double circuit, high voltage over head line, with one circuit live
- High voltage regulator
- Industrial panels/grid end panels as per prevailing voltage levels
- DC station batteries
- Disconnect switches/isolators
- Instrument transformer (CTs, PTs, and CVTs)
- Insulating oils, oil tanks, SF6 gas and gas cylinders,

D: Safety Precautions for High Voltage Live Line work on High Voltage Over Head lines

It shall include:-

- The authorization requirements for staff carrying out the operations
- The live line tools and equipments to be used and the arrangements for keeping them in good condition must be clearly defined such that:-
- Complete package of T & P (hand tools and machine tools), extension ladder fiber, adjustable strain pole, conducive shoes, conducive sit (Socks, gloves, trousers, shirt etc.), torsion, nut, torsion ratchet wrench, strain link stick, hot-end suspension yoke, cotter key pusher, strain pole carrier, moisture eater, abrasive cleaning pad, hot-stick tester, hit-test insulator tester, generator 5 KW, live-line rope etc.
- The general safety precaution to follow

E: Safety Precautions for the Testing of High Voltage Systems

This shall consist of the followings:-

- General precautions to take
- Work under a sanction for test
- The testing of high voltage apparatus

F: Safety Precautions and procedures applicable to Low Voltage Systems

- General requirements for work on dead low voltage apparatus and lines
- Additions precautions for work on dead low voltage cables
- Additional precautions for work on dead low voltage over head lines
- Precaution for work on live low voltage apparatus
- Precaution for work on live low voltage over head lines
- Precaution for work on live low voltage cables
- Testing of low voltage apparatus
- Calibration of electrical testing equipments

PSC-6.6 Safety for Power Plants

Each licensee shall cover the specific safety requirement for the power plant working environment and shall include but not limited to the followings;

- Boiler operation
- Boiler maintenance
- Turbo generator operation & maintenance
- Import plant auxiliaries
- Water plant treatment
- Workshop of the power plant
- SOPs in case of spillage in the plant & in case of fire accident.
- Work permit electrical maintenance section
- Works permit for maintenance section
- Works permit for instrument/control section

PSC-6.7 Safety Policy for Transportation

Each licensee shall cover the all procedures related to

- General Instructions
- SOPs for checking/maintenance
- Driving
- Parking
- Operation of trucks, trailers & forklift trucks
- SOPs, to be followed in case of accident.
- Speed limits inside the premises of NTDC/DISCO works/sites & on general public roads/areas.
- Training of drivers
- Motivational methodologies for drivers

PSC-6.8 First Aid Procedures

First aid procedures shall cover the procedures, guidelines, implementation strategies and complete data base & suggested measures for preventive action and shall include but not limited to the followings:-

- General instructions
- Hemorrhage (bleeding) and including the measures for internal hemorrhage, nose bleeding
- Physical/electric shock
And also the informative charts describing the effects with respect to current level, human body resistance and the other factors that affect the human body
- Sun stroke, head stroke
- Fainting
- Fractures (broken bones)
- Transportation/shifting of the victims
- Wounds
- Splinters or foreign substances in the body
- Animal/snake bites
- Burns (thermal, electrical & chemical)
- Eye injuries
- Sprains/strains,
- Bruises
- Frost bite
- Heimlich maneuver

PSC-6.9 Resuscitation & Rescue Procedures

Resuscitation & rescue procedures shall include but not limited to the followings:-

- General instructions
- Methods of pole top rescue
- Artificial respiration

Requirement:-These shall be defined by each Licensee with detailed procedures and understandable diagrams/pictures and methodology for training of person to perform such activity.

PSC-6.10 Data Base of Power Safety and Operation and Maintenance Charts

Each licensee shall cover the complete information regarding operation and maintenance charts and these shall be readily accessible to all concerned. There shall be no confusion from tagging/markings point of view for electrical equipments & materials.

In addition to this other charts i.e.

- Charts related to clearances from electrical equipment & material functioning point of view
- Safety signs/signals charts at required locations/places
- Exit signs
- Charts for safety instructions for visitors/contractors/others
- Charts for useful knots
- Charts for strengths & weight of material
- Charts for safe loads on different types of ropes
- Charts for safe working of cranes

- Operation and maintenance charts
- Fire extinguishers
- Road signs
- Warning signs
- Danger signs
- Charts for allowable factor of safety, clearances & other applicable data.
- Permit to works (PTWs)
- Charts for motivation of staff /persons
- Maintenance & inspection schedules
- Charts for conversion tables and
- others required as per standard engineering practices

These charts shall be under-standble to workers/labours in Urdu also, in addition to English.

PSC- 7 Glossary of Terms used in Power Safety Manual

Each licensee shall cover the complete glossary of all important terms & words being used in power safety manual. No technical item shall be overlooked.

PSC 3.1 The Safety Code Review Panel

All the Licensees shall jointly establish & maintain the Panel within two months of the notification of the code, which shall be a standing body to undertake the functions as detailed below.

The panel shall function in accordance with the rules and procedures to conduct business duly approved by NEPRA. Subsequent to the establishment of the panel, it shall formulate its rules and procedures to conduct business and submit to NEPRA within three months of the establishment of the Panel.

The panel shall consist of the following and shall meet at least two times in a year:-

- a. A Chairman with one member appointed by each Transmission & Distribution Licensee (Chairmanship will be on rotation basis)
- b. A person appointed by the Authority.
- c. The following members:-
 - i). 1 person representing Consumers Protection Group (CPG)

- ii). 1 person from the Industry or Engineering Institution or PEC
- iii). One representative from PSQCA
- iv). One representative/POI of each province
- v). A representative of each provincial consumer protection council

The Panel:-

- a. Keep the Safety Code & its working under review.
- b. Review all suggestions for amendments to the Safety Code which any consumer through the representative of CPG in the Panel may wish to submit to a Licensee for Consideration by the Panel.
- c. Publish recommendations as to amendments to the Safety Code that a Licensee or the Panel believes to be desirable and the reasons for the recommendations.
- d. Submit the agreed recommendations to NEPRA for approval.
- e. Issue guidance on the Safety Code and its implementation, performance and interpretation , as and when requested by any user.
- g. Consider what changes are necessary to the Distribution Code arising out of any un-foreseen circumstances as referred by the Licensee.
- h. The Transmission/Distribution Licensee shall inform the proposed amendments to the Code to its users through wide circulation in the press and if possible comment in writing with those who are liable to be affected by any proposed amendments to the Panel for Discussion prior to such consultation.

PSC 3.3 Code Administration

Transmission/Distribution Licensee shall be responsible for the enforcement and administration of the Safety Code.

PSC 3.4 Force Majeure Conditions

Certain Provisions of the Safety Code may be suspended in whole or in part pursuant to any directive given by the Authority under Force Majeure conditions. Licensee shall inform NEPRA within 07days of its initiation about a Force Majeure Condition.