

# BHUTAN POWER CORPORATION LIMITED



## SAFETY RULES

2021

SAFETY & QUALITY DIVISION

HR & CORPORATE SERVICES





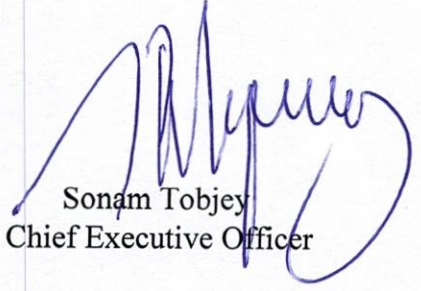
## FOREWORD

The Safety Rules specify the procedural requirements while undertaking various works of the Bhutan Power Corporation Limited (BPC), be it by itself or by any other agencies / contractors. These Rules are framed in line with the codal requirements of the Safety Code and Safety Regulations of the Bhutan Electricity Authority (BEA) and address the safety requirements to be considered during design, construction, operation and maintenance of BPC's electrical power infrastructure. While these Safety Rules emphasize the principles and the normative guidelines in formulating systems covering safety, a separate Safety Manual, prepared in line with the general guidelines of these Safety Rules, shall address the detailed procedures for various operations of BPC.

In the event of any discrepancy between these Safety Rules and the Safety Manual, the guiding principles of these Rules govern. In the event of any discrepancy between these Safety Rules and the codal requirements of BEA's Safety Code and Safety Regulations, the latter shall govern. These Safety Rules shall come into effect on the date of notification and shall be binding on all the employees of BPC and the external agencies working for BPC during the course of such assignments with BPC for the works associated with BPC.

There shall be no exceptions to the application of these Rules, unless explicitly declared otherwise by BPC management for any specific works with the prior consent of the Regulatory Authority and these Rules are deemed to be part of any works within BPC or contracts of any external agencies with BPC, irrespective of whether or not it is explicitly specified in such contracts.

Tashi Delek

  
Sonam Tobjey  
Chief Executive Officer







## 1.0 Interpretation

These Rules shall be interpreted in the way they have been formulated and in strict compliance to the intent thereof.

## 2.0 Definitions

<b>Authority</b>	Bhutan Electricity Authority
<b>High Voltage</b>	Voltage above 33kV
<b>Low Voltage</b>	Voltage upto 1kV
<b>Medium Voltage</b>	Voltages ranging from 1kV to 33kV
<b>Minimum Approach Distance</b>	The minimum distance to be maintained by personnel from bare conductors, unless special safety precautions are taken.
<b>Safety Code</b>	The Safety Code formulated by Bhutan Electricity Authority
<b>Safety Equipment</b>	Tools or other equipment specially designed to protect persons from potential hazards.
<b>Safety Regulation</b>	The Safety Regulation formulated by Bhutan Electricity Authority
<b>Test Permit</b>	The permit for testing of equipment during / after maintenance.
<b>Work Permit</b>	A permit to carry out works on equipment.

## 3.0 Safety Rules

The Safety Rules are broadly categorized to cover the following:

- 3.1 Safety Awareness;
- 3.2 Hazard Identification;
- 3.3 Use of Safety Equipment;



- 3.4 Access Control;
- 3.5 Minimum Approach Distances;
- 3.6 Work Permits;
- 3.7 Test Permits;
- 3.8 Isolation and Earthing;
- 3.9 Work on equipment requiring special precautions.

All works associated with installation, testing, commissioning, operation and maintenance of various electrical equipment and / or the desk work in the various offices, be it temporary or permanent, shall be carried out in a way that is safe for the associated personnel, the equipment, premises within the vicinity of such operation, as well as to those personnel / equipment / premises which would have a direct consequence of unsafe results due to operation of upstream / downstream equipment. The Safety Manual of BPC shall clearly identify all works and provide for the requirements of such safe operation.

### **3.1 Safety Awareness:**

There shall be in-built and sustained mechanism to ensure that all concerned personnel as well as those likely to be impacted by any activity are kept well informed about the safety. The Safety Rules shall address all processes through which the Safety Awareness can be effectively made. These shall include but not limited to:

Internal Documented Procedures, which should ensure that all concerned and affected departments / personnel, external or internal to the organization are kept informed and this shall specifically address the following:

- (a) General Safety signs to be placed in all work places warning all personnel about possible pitfalls, like steep steps, overhead clearances, sharp articles etc., which are likely to cause injury / accident to personnel or equipment, if not properly taken care of.
- (b) Safety Instructions to be prominently displayed at work places pertaining to the specific works, intended to be carried out at such places.
- (c) Caution Plates to be used for warning public about the safety hazard at the work locations like roads, pavements etc. as well as on the electrical infrastructure in public places.





- (d) Periodic awareness campaigns to be conducted within the organization, especially with respect to reorientation, review of the safety system in terms of special tools / equipment and based on safety / accident feedback.
- (e) Public notices to be issued periodically on electrical hazards and safety through mass media and other platforms.
- (f) The employees shall take an active part in the BPC's safety program and apply it in their everyday work.

### 3.2 **Hazard Identification:**

It is of paramount importance that the procedures set forth in the Safety Manual shall address prior identification of hazards, to avoid any untoward incidents / accidents. The procedures set forth in the Safety Manual shall provide forms for various types of maintenance work and these forms shall contain earmarked space for 'Hazard Identification'. This form shall be attached to the work permit application (alternatively the procedures set forth in the Safety Manual can integrate these requirements in the Work Permit form itself) along with the steps to mitigate the same. All the work permits and procedures shall highlight the hazard operations along with the precautions to be taken and the work permit shall ensure compliance of the same, before formal clearance. Further, the procedures in the Safety Manual shall ensure that the work area is appropriately barricaded with Warning Signs both for the personnel of BPC as well as general public.

1. One of the best ways of preventing accidents shall be to eliminate hazardous conditions as soon as they are discovered. Where a hazard cannot be removed, accidents can be prevented by taking reasonable and proper precautions.
2. Every employee shall watch for any hazardous conditions or unsafe practice and report to his Supervisor any that comes to his attention.
3. Accidents or near accidents which do not result in personal injury (potential injury) shall be reported and investigated the same as if any injury had occurred. Every accident is a potential injury. Elimination of all accidents is the only sure way of preventing personal injuries.

### 3.3 **Use of Safety Equipment:**

The procedures in the Safety Manual shall clearly bring out the applicability and use of apt safety equipment for different O&M and construction activities. These shall address the following aspects:





- (a) Work places prone to physical disturbance – slippery, land-slide prone and any other site-specific nuances (Ensure use of proper outfit including helmets);
- (b) Work places requiring utilizing other's infrastructure (natural or borrowed) for access to the maintenance point – e.g. ROW clearing, cutting of tree branches etc. (Ensure use of safety belts and / or other devices to prevent accidents);
- (c) Working on live system – Use of Electrically Safe (Apt i.e appropriately rated) insulated gloves, physical earthing of the personnel and care to ensure safety, use of appropriate tools and safety equipment for live line maintenance, regular training on use of special equipment etc.

All the safety equipment shall be maintained in a way that it is readily useable and untested and inappropriate / damaged safety equipment shall not be issued for use. The procedures set out in the Safety Manual shall ensure compliance to regular testing and / or calibration of equipment and proper record of such certification.

Any safety equipment as well as tools, especially those associated with live-system maintenance, shall be issued and used only by personnel trained to use such equipment and the safety procedures shall spell out such training requirements both for new entrants as well as refresher training to ensure readiness of the personnel to use such tools.

While it is not the intent to specify and / or restrict the use of safety equipment, the necessity and applicability of any safety equipment shall be reviewed on need basis and implemented in line with these Safety Rules.

#### 3.4 Access Control:

The procedures in the Safety Manual shall provide appropriate guidelines for access control to the work areas. Detailed procedures shall be drawn up to ensure that all personnel in any work area are appropriately accounted for. Proper system of ensuring that only authorized personnel with due identity are permitted into the work area and the number and identity of the personnel shall be maintained. Special precautions shall be enumerated for works associated with physical safety such as blasting operations.

Special requirements of charging of lines and / or substations should ensure that all the personnel associated with the works are in electrically safe positions / places and the procedure to ensure head-count in these operations properly established.

The Access Control requirements shall clearly ensure that the physical outfit like the type of dressing, requirement of protective gear like helmets and footwear are documented and enforced.

All work permit procedures shall incorporate the access control monitoring and implementation without exception.





Where any equipment is in areas accessible to general public unless appropriately barricaded, the following shall be strictly enforced:

- (a) Medium or High Voltage equipment and substations shall be located less than 3 meters above ground level shall have physically demarcated area, enclosed securely by appropriate fencing / boundary wall with locked gates wherever applicable or provide anticleimbing devices (As per the approval from BEA) to prevent unauthorized access. Access to operational areas like the control room, switchyard, switchgear room for MV or HV switchgear and areas where sensitive equipment likely to affect safe operation of the electrical system are located shall have appropriate entry restrictions and locking facilities.
- (b) A register shall be maintained to maintain proper log of the issuance of keys to such installations and where separate security personnel are provided, the same shall ensure proper registration of the entry restrictions. Keys shall be issued only to competent authorized personnel.
- (c) While the safety system may provide maintenance of master keys for issuance to competent authorized personnel to provide uninterrupted access either due to the emergency nature of the works or the supervisory role of the personnel, the system shall ensure that all entries / exits of such personnel are properly logged.
- (d) No persons other than the authorized personnel shall be allowed in the work area unless such persons are accompanied by the authorized personnel (who would be solely responsible for the personnel and equipment safety) and all safety precautions enumerated in the Safety Manual adhered to.
- (e) Infrastructure in publicly accessible places like towers and poles shall have reasonably adequate provisions with Warning Signs and as felt necessary with preventive access mechanisms to ensure safety of the general public.
- (f) Every reasonable effort shall be made to protect the public at all times where BPC work is in progress by using signs, barricades, personal warning or notification through media wherever necessary.
- (g) When working on a customer's premises or public property, every effort shall be made to avoid hazards to persons, or unnecessary property damage. All tools, equipment and excess material shall be removed from the site when the job is completed.
- (h) When work is conducted along public streets or highways, pedestrian and vehicular traffic shall be warned by signs and flags by day and reflectors by night.
- (i) Barriers shall be placed around all open manholes, exposed ditches and excavations shall be substantially boarded over to prevent persons, animals or vehicles falling into them.





- (j) During the night and in all dark locations, the area shall be illuminated and/or secured at any obstruction, excavation or opening which is likely to cause injury to employees or the public.
- (k) Timely maintenance of equipment or structures shall be carried out as per O&M manuals.

### 3.5 Minimum Approach Distances:

1. A safe distance from live electrical equipment must be maintained by all persons; this safe distance must also apply for any conducting tools or material handled by a workman. In performing work near live electrical equipment, particular care must be exercised in watching body and tool or material movements to avoid accidentally coming into the danger zone.
2. Under no circumstances shall unqualified persons and part-time employees be allowed to work closer to live electrical equipment than the distances allowed in table no.1 below for the respective voltage range. This general rule shall be observed by all employees in the approach of live electrical equipment, except as may be authorized by the competent person in charge for qualified personnel.

Table 1 – Overhead Electrical Conductor Clearances

Particulars	220 kV	132 kV	66 kV	33 kV	11 kV	LV
<b>Ground clearance</b>						
. Across Street	7.0 m	6.1 m	6.1 m	6.1 m	6.1 m	5.5m
. Along street	7.0 m	6.1 m	6.1 m	6.1 m	6.1 m	5.5 m
. Elsewhere	7.0 m	6.1 m	5.5 m	5.8 m	5.8 m	4.6 m
<b>Separation b/w phases</b>						
. Horizontal	8.4 m	6.8 m	3.5 m	1.5 m	0.7 m	#
. Vertical	4.9 m	3.9 m	2.0 m	1.5 m	0.6 m	#
<b>Clearance from buildings</b>						
. Horizontal	3.7 m	2.8 m	2.1 m	1.8 m	1.2 m	#
. Vertical	5.5 m	4.6 m	4.0 m	3.7 m	2.5 m	#

Source: BEA Safety Code 2008.





\* Horizontal clearance to be obtained at worst load condition with maximum deflected conductor position including that of insulator string if any.

\*\* Vertical clearance to be obtained at maximum still air final sag (at maximum temperature or ice coated conductor at zero degree Celsius).

**NOTE:** For the stringing of TV and All Di-electric Self Supporting (ADSS) cables on electrical distribution poles of BPC, the minimum clearance of 1.6 m to be maintained from bare live conductors in case of 33kV, 11 kV & LV lines and a minimum clearance of 0.50 m between fully insulated LV conductors and ADSS fiber cables. (Source: BEA letter No. BEA/CEO/BPC/ 2017-18/495 dated December 22, 2017.)

Table 2 – Minimum Approach Distances

Nominal Design Voltage (kV)	Minimum Approach Distance (meter)
400	8.3
220	5.5
132	4.2
66	2.8
33	2.1
11	1.5
0.4	0.5

*Note: The above minimum approach distances have been derived by adjusting values typically used in other jurisdictions to allow for the high altitudes in many parts of Bhutan*





It must be realized that there will be some instances where it will be quite unsafe to allow unqualified persons and part-time employees to work even this close to live electrical equipment.

1. In planning for work to be carried out by qualified personnel closer to live electrical equipment than the distance stated in Table No.1, careful consideration must be given to the following points in establishing the safe distance for work:
  - a. The work location, the job to be done, the job method and tools to be used with consideration to the proximity of adjacent live electrical equipment.
  - b. The length of time workmen will be required to work near the live electrical equipment.
  - c. The training and knowledge of the workmen with regard to the hazards of the work situation.
  - d. The selection of competent workmen to perform the job.
  - e. Careful consideration must be given to the use of any applicable safety protective devices.

In addition, for each job to be performed closer to live electrical equipment than the distance stated in Table No.1 – Overhead Electrical Conductor Clearances a distance sufficient to allow for any unplanned or accidental movement by workmen and conducting tools or material they may be handling shall be established by the competent person in-charge of the job. This established distance must be added to the distance stated for Qualified Personnel (refer BEA Safety Code 2008) for the respective voltage range to obtain the safe distance so obtained must be such that following any unplanned or accidental movement, the respective distances will be maintained. They must never be reduced under any circumstances, unless protection is provided with approved protective devices such as rubber gloves, hose, hoods or barriers where applicable.

#### WORKING ON LIVE LINES AND EQUIPMENT 230 TO 400 VOLTS

1. Minimum protection for work on different voltages shall consist of the following:

Nominal Voltage	Minimum Protection
230 - 400 V	Requires use of standard rubber gloves and other rubber protective devices, or hot-line tools
Above 400 V	Must be de-energized and isolated.





2. Where close clearances or other conditions increase the possibility of arm contact with live 230 to 400 volt circuits; linemen's rubber sleeves shall be worn in addition to rubber gloves.
3. Handling and working on live electric circuits and equipment are hazardous occupations and shall be done only by workmen who are qualified by training and experience to do the work safely, and only after authorization.
4. Before starting any work on lines or equipment, the work shall be clearly understood by each man by carrying out Job Safety Analysis (JSA) and Tool Box Meeting (TBM).
5. Workmen doing live-line work shall devote their undivided attention to the work at hand. Unnecessary conversation should be avoided.
6. When two men are working within reach of each other, they shall never work on different phases or phase and ground combinations.
7. Where it is necessary for one man to change his working position on a pole or tower, the other man shall not do any work on live conductors until the man has reached his new position.
8. Whenever it becomes necessary to replace a worker or Supervisor during a job, such replacements shall be made only after the replacing worker or Supervisor has been fully informed of existing conditions.
9. Workmen shall wear long sleeved shirts, sweaters or jackets with sleeves rolled down when engaged in rubber glove work.
10. Weatherproof braid and conductor insulation, such as rubber or paper, shall never be relied upon for protection of workmen. All precautions for handling live conductors shall be taken when handling insulated wires and cables.
11. Telephone and remote control circuits and de-energized distribution circuits on transmission line poles shall be worked with rubber gloves unless such telephone or remote control or distribution circuits have been grounded on both sides of the workman. (Proper clearance shall be obtained before remote control circuits are grounded).
12. All live conductors within reaching or grabbing distance shall be covered with rubber protective equipment or isolated by suitable barriers.
13. Secondary circuits, guys, ground wires, telephone lines and similar attachments within the working area shall be covered wherever possible.





14. Rubber protective equipment shall be installed from a safe position below the conductors or equipment to be covered wherever possible.
15. Rubber gloves shall be worn when installing and removing rubber protective equipment or barriers on live circuits unless installed by means of hot sticks.

#### WORKING NEAR LIVE EQUIPMENT

1. When working near live equipment, all possible hazards must be identified and each man shall plan his moves and take extreme care in moving from one position to another.
2. When working within four feet of live equipment energized above 230 volts, rubber protective equipment, suitable barricades and voltage detectors/proximity alarm shall be used to prevent workmen from coming in contact with live parts.
3. Where impractical to erect barriers between the men at work and live parts within four feet of their hands or objects being handled, continuous watch shall be kept by the Supervisor or someone specifically designated by him for that purpose.
4. When raising or lowering poles between or near live parts, workmen shall exercise care and take necessary precautions. Whenever high voltage is encountered, absolute line shutdown shall be taken in order to avoid any danger of its contacting live parts.
5. When a truck-winch line or derrick is used near live parts, all workmen except the driver shall stay away from the truck. The driver shall see that the truck is clear from live lines before leaving and entering the truck.
6. Wire being strung or removed close to live circuits or equipment shall be considered alive and shall be handled with rubber gloves, dry hand lines such as polypropylene and other necessary protective equipment, such as barriers or grounding, as voltage may require. This rule applies to both linemen on poles and ground men handling conductors and reels on the ground.
7. Temporary elevated platforms erected on poles or structures shall be of sturdy construction and capable of safely holding the men and material required working on them. They shall be equipped with a guardrail of rope or lumber not less than 80 cm in height and also a kick plate not less than 5 cm in height.
8. Employees working on platforms erected on poles or structures shall wear approved safety belts fastened to the pole or a secure part of the structure.





### 3.6 WORK PERMITS:

#### 3.6.1 Definitions of Words and Phrases used in the Work Permit Form

**Authorized Person:** a BPC employee who is In charge of the line/substation during the period of maintenance work. For TD, he shall be Substation In charge only. For DCSD, he shall be the O&M In-charge/Service Centre In-charge.

**Code Word:** A word that is mutually agreed between the official taking permit and the official issuing permit. The code word must be kept secret and should not be shared with any other person except to the official cancelling permit if required.

**Details of operation carried out:** Step wise isolation procedure of the above line/equipment e.g. opening of isolator/circuit breakers, closing of earth switch etc.

**Line/Equipment:** a transmission/distribution line or electrical equipment for which the permit to work is being obtained. Mention the GPS number, tower number etc.

**Official Issuing Permit:** a BPC employee who is the authorized person to issue the permit. The person doing the work cannot issue a permit to himself.

**Official Taking Permit:** a BPC employee who is entrusted with the duty to carry out the work. In case of works being undertaken by contractors, the concerned head of the BPC office who is supervising the works of the contractor shall obtain the permit on behalf of the contractor and be responsible for all the conditions contained herein. The official taking permit is the Permit Holder.

**Official Returning Permit:** a BPC employee who returns the permit after the completion of work. Only the Permit Holder can return the work permit.

**Official Cancelling Permit:** a BPC employee who is the authorized person to cancel the permit. The Official Cancelling Permit and the Official Issuing Permit can be same or different depending on the duration of the permit.

**Qualified Assistant:** Any Co-worker in the maintenance team/group.

**Return Time:** The time when the work permit is returned either verbally/written after the completion of the work.

**Switching Code No:** A number provided by BPSO for carrying out the work based on prior approval accorded by them. The switching code No. shall not be applicable for work permits issued by the authorized person for the works which does not require the approval from the BPSO.





**Station:** the location from where the Official Issuing Permit carries out his duties e.g. Substation control room, office of substation / shift in charge, etc.

**Signing Time:** The time when the permit holder personally signs on the work permit form within the designated period after the completion of the work.

In this SOP, the word “he” shall be construed to mean any person irrespective of their gender.

### 3.6.2 Purpose

A Work Permit is a protection guarantee issued by the operator to a qualified person (Permit Holder) under which specified work is authorized on specified line/equipment.

The Work Permit aims to ensure a high standard of protection for people, environment and property, safe working environment and to reduce the risk of accidents occurring on the job.

### 3.6.3 Scope

A Work Permit shall be applicable to all planned work, ad-hoc/emergency shutdown works, normal routine maintenance works, etc. in the Transmission and Distribution system in BPC irrespective of the voltage levels involved.

### 3.6.4 Types of Permit & its applicability

- I **Work Permit:** a written form authorizing a person to undertake specific work in a designated area for a specific duration. The permit is valid only for the work and duration for which it has been obtained and may not be re-used for similar work at other times and locations. If the work is not completed within the specified duration, the duration of the permit may be extended after obtaining approval from the authorities concerned.

The Work Permit shall be obtained for maintenance of line/equipment.

- II **Test Permit:** a written form authorizing a person to undertake specific testing in a designated area on particular line/equipment for a specific duration. The permit is valid only for the test and duration for which it has been obtained and may not be re-used for similar tests at other times and locations. If the test is not completed within the specified duration, the duration of the permit may be extended after obtaining approval from the authorities concerned.





The Test Permit shall be obtained for test charging of new transmission/distribution lines/substations, relays and protection systems, circuit breakers (CB), CTs, PTs etc. and the restoration of equipment after repair/maintenance.

Note: Although the form is same for both types of permit, the relevant type of permit should be checked on the form.

### 3.6.5 Methods for obtaining Work Permit

- I **Verbal Work Permit:** A Verbal Work Permit is to be used in connection with work on line/equipment when there is an emergency and where it is impossible for a Written Work Permit to be obtained. A verbal guarantee of protection is given to the applicant.
- II **Written Work Permit:** A Written Work Permit is to be used in connection with work on line/equipment where the line/equipment concerned is near the Operator. A written guarantee of protection is given to the applicant.

### 3.6.6 Roles and Responsibilities of the Officials

- I It is the responsibility of the Official Issuing Permit to:
  - (a) Obtain Switching Code No. from BPSO wherever applicable. The Switching Code No. has to be obtained only when the circuit breaker is ready for operation (open/close) after taking necessary after taking necessary safety measures.
  - (b) Provide Code Word only to the Official Taking Permit and keep it a secret. He can share the code word only to the next person relieving him;
  - (c) Fill up the work permit form even if the work permit is issued verbally;
  - (d) Ensure that the Verbal Work Permit is issued only for emergencies and when it is impossible for a Written Work Permit to be issued after establishing the genuineness of the situation.
  - (e) Make necessary arrangement with the Permit Holder for providing means of communication at all times;
  - (f) Ensure completeness and correctness of the information for both Verbal and Written Work Permit;
  - (g) Authorize the work permit by signing on it with name/personnel number, contact number and designation;





- (h) Ensure that the area and equipment are made safe before commencement of work;
- (i) Ensure that there are no conflicting activities in the same location;
- (j) Clearly mention the name of the line/equipment for which the Work Permit is issued;
- (k) Ensure that the line/equipment on which the work is to be carried out is physically disconnected or separated from ALL SOURCES of electrical energy by means of isolators, circuit breakers etc. In case of draw out type of Circuit Breakers, it shall be ensured that the mechanism is fully drawn out;
- (l) Ensure that all tags and signs are prominently displayed so that personnel are aware that the line/equipment is isolated and not to be operated;
- (m) Ensure that the details of the work permit issued are entered in the work permit register;  
and
- (n) Ensure that all work permits are issued in accordance with this procedure.

**II It is the responsibility of the Official Taking Permit (Permit Holder) to:**

- (a) Obtain the work permit personally from the station after signing on the form. He should take the original copy of the work permit and keep it with him at all times until it is returned. If he is unable to personally visit the station, he may obtain the Work Permit verbally through telephone followed by SMS (Message) clearly mentioning name and personnel number. However, it is mandatory for him to personally visit the station after completing the work to sign the work permit and take the original copy with him;
- (b) Obtain the code word from the Official Issuing Permit and keep it a secret. He shall not divulge the code word to anyone;
- (c) Constantly maintain a means of communications with the Operator while the work is in Progress;
- (d) Ensure that the work is performed only on the line/equipment for which the Work Permit has been obtained;
- (e) Ensure safety of all persons working under his protection and for all other persons who might directly or indirectly be exposed to danger;
- (f) Be present in the work area covered by the Work Permit except in case of emergency due to medical conditions, family problems etc. In case of such emergencies he may delegate





all his responsibilities EXCEPT THE RIGHT TO RETURN THE PERMIT to a qualified assistance to whom he has fully explained all the details;

- (g) Identify hazards and have necessary controls in place in case of safety incidents;
- (h) Brief the personnel working under him about the hazards of the job and ways to mitigate them;
- (i) Perform safety drills and Tool Box Meetings (TBM);
- (j) Make the work area safe and cordon off if necessary;
- (k) Carry out work in a safe manner and in accordance with relevant safety codes, rules and regulations;
- (l) Maintain records of the personnel working under him along with the details of works done; and

**III It is the responsibility of the Official Returning Permit to:**

- (a) Return the permit to the station personally for cancellation. If he is unable to visit the station personally to cancel the work permit, he may do so verbally through telephone followed by confirmed delivery of SMS (Message). However, he must visit the station personally within a week and take the original copy of the cancelled permit;
- (b) Inform the code word to the Official Cancelling Permit through telephone followed by SMS clearly mentioning name, personnel number and the code word; and
- (c) Confirm that all men are clear, that the line/equipment is in good condition and that all temporary grounds have been removed and is safe for charging prior to returning the permit.

**IV It is the responsibility of the Official Cancelling Permit to:**

- (a) Check and ensure that the work permit is returned by the permit holder only and no other person except in emergencies with prior information provided to the Official Cancelling Permit by the Official Taking Permit;
- (b) Cancel the permit by signing on the form after recording the date and time of return of the work permit;



- (c) Match the code word issued by Official Issuing Permit and the code word given by the Official Returning Permit;
- (d) Ensure appropriate persons are informed when a job is completed and the permit is cancelled; and
- (e) Remove all tags and signs and restore the system after obtaining the required clearances if applicable; and
- (f) Update the work permit register.

## **VII. General Rules**

- (a) For the approval of operating any elements of power system, due process as per Grid Code Regulations, the BPSO procedures should be followed.
- (b) No part of the Transmission System shall be deliberately isolated from the rest of the transmission system except under an emergency, when serious damage to costly equipment is imminent and when such isolation is specifically instructed by the system operator.
- (c) The issuance of a Work Permit shall be subject to the applicant's acceptance of the terms and conditions of issuance.
- (d) Work Permit shall become effective at the moment of issuance and shall cease to be effective at the moment of return. The protection shall be continuous for the period between issuance and return.
- (e) All Work Permit shall be self-sustaining, that is, affording their own protection and not depending on the apparent protection of some other Work Permit.
- (f) Under no circumstances shall any Work Permit be deemed to protect anyone who is not authorized by the Permit Holder to work under his protection.
- (g) It shall be recognized as a basic principle that all parties issuing and receiving Work Permits shall convey each other any information which might assist the others to intelligently carry out their work, or which might influence their judgment, acts or decisions.
- (h) The Work Permit Booklet should be printed in duplicate with preprinted numbers and the color of the original shall be yellow and the duplicate shall be white.





### 3.8 ISOLATION AND EARTHING:

Except when working on live-systems with appropriate outfit and tools, the work on any equipment shall ensure that both side of the equipment is isolated from the live system and is safe to work with even in case of any inadvertent closure of the switch / breaker associated with the equipment. To ensure that such inadvertent operation is avoided at all costs, the breaker and / switching equipment shall be kept locked in off-position with a sign-board to indicate that personnel are at work and the switch shall not be operated. The equipment shall have temporary good earthing on either side to ensure that the equipment is at the same potential as the personnel working. Where the safety necessitates that the system be isolated fully and any inadvertent operation from any remote end switching shall not affect the personnel, physical isolating mechanism shall also be ensured at the work place (e.g. isolators near the transformers in the vicinity of the work place to be in local mode operation only; work on transmission lines to ensure jumper opening before major works are carried out). Both the earthing mechanism and the isolating mechanism shall be visible from the work place, unless the work permit specifies otherwise and other mechanisms for ensuring safe earthing of the system are adopted. In case of transmission lines, the physical maintenance shall be preceded by not only the either side breakers being in open condition, but also the respective line-side earth switches at either end substations being closed.

All maintenance mechanisms, especially for remotely controlled SCADA operations, shall ensure that the equipment / Line being maintained is taken for Local Control (from the respective substations) with no operation possible from such SCADA systems.

### 3.9 Work on Equipment requiring special attention:

#### 1. ISOLATION OF EQUIPMENT

- a. Method of isolation shall be carried out by means of the NORMAL equipment installed for that purpose, such as: circuit breakers; disconnectors; fuses; valves and dampers. Alternatively, isolation shall be carried out by shutting down the source of supply.
- b. Special Instructions for isolation

In carrying out the necessary isolation, the following special instructions must be complied with where applicable:

- i. Isolation from electric supply -the isolation provided must be by means of a visible break in the supply circuit. Where the supply could be restored by means of a pushbutton or automatic device, these MUST be made inoperative by locking, blocking or by removal of the fuses. Isolation MUST include isolation from feedback from interconnected equipment, such as potential or instrument transformers. In the case of HV transformers, the isolation MUST include isolation of the HV neutral or neutrals, if these are connected to the System. In the case of a generating set, the isolation MUST include immobilization





of the prime mover, AND isolation of the excitation circuit where separate excitation is used.

- ii. Isolation of water culverts -where a water culvert or water passage has to be entered, the valves or gates closed to prevent admission of water MUST be locked in that position OR their operating drives disconnected. In the case of motorized valves, which cannot be operated manually, removal of fuses on the motor supply may be used as an alternative.
- iii. Isolation from Dangerous Gases -where a supply of gas such as hydrogen, chlorine or carbon dioxide is connected to a confined space, which is to be entered, isolation of the space must include physical disconnection of the supply pipe OR the insertion of blank flanges OR an equally effective alternative in order to prevent a dangerous build-up of gas in the space, due to slight leakage past valves.

Maintenance of power cables shall ensure that all safety measures including earthing of the cable are adhered to. The cable being maintained shall be isolated from the power source, tagged and covered to ensure inadvertent contact to any live system.

Work on transformers and / or any lines shall not be carried out unless all phases of the equipment are isolated, even if the work involves only one / two phases or the neutral only.

Maintenance on multicircuit lines shall ensure that all the circuits are switched off before maintaining any one circuit, unless necessary live-system tools / equipment / gear are being used and the work permit permits the same.

Further while working on live systems, necessitating replacement or maintenance of current transformers, it shall be ensured that under no case will the CT secondaries are open-circuited. Maintenance on protection relays and metering systems involving CT connections, shall ensure that the CT circuits are never under open condition.





**Appendix I: Format for work-permit**

**PERMIT TO WORK** ☐ **TEST** ☐

**Permit No.:** .....

**Date:** .....

**Issued to:** .....

You are hereby permitted to work on (line/equipment).....  
at.....(Location) from .....Hours of.....to.....Hours of  
.....to.....Your switching Code  
No..... /Code Word is .....

We have carried out the following operations to isolate the above line/equipment to ensure a safe working environment for you:

1. ....
2. ....
3. ....
4. ....

However, please take additional safety precautions and measures, including providing temporary earthing(s) wherever necessary, to avoid any untoward incidents and/or accidents.

**Signature of Official Issuing Permit**

**Name:**

**Personnel No:**

**Designation:**

**Date/Time:**

**Contact No.:**

**Signature of Official Taking Permit**

**Name:**

**Personnel No:**

**Designation:**

**Date/Time:**

**Contact No.:**



**RETURN OF WORK PERMIT ☐ TEST PERMIT ☐**

I hereby return the permit No.....with switching Code No./Code Word  
.....at .....(Hrs), dated.....availed on the above  
line/equipment. The reason of fault  
was..... I certify that all  
men, materials and temporary earthing(s) have been removed from the work area and that the  
above line/equipment is clear for operation and is safe to charge.

**Signature of Official Returning Permit**

**Name:**

**Personnel No:**

**Designation:**

**Date/Time:**

**Contact No.:**

**Signature of Official Cancelling Permit**

**Name:**

**Personnel No:**

**Designation:**

**Date/Time:**

**Contact No.:**

