

Bhutan Power Corporation Limited



THE SAFETY MANUAL

Safety & Quality Division
HR & Corporate Services

May 2021
(First Edition)



FOREWORD

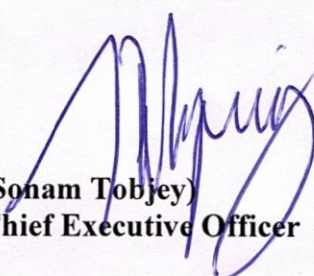
BPC is pleased to issue the revised edition of the Safety Manual and General Rules & Regulations, the 2nd edition 2021. The first edition 1993 of the Safety Manual and General Rules & Operation Regulations was issued by the erstwhile Department of Power, Ministry of Trade and Industry. These relevant provisions of the 1993 edition are still retained and those that have become irrelevant in today's context have been amended and revised where necessary to conform to latest trends, technologies and business environment. In coming out with this manual, numerous in-house brain storming sessions amongst the employees of Safety & Quality Division and series of consultative processes and workshops with various Services and Departments were held.

This edition is aligned with the safety provisions of the Labour and Employment Act, 2007 and the Regulations on Occupational Health and Safety. The revision also includes rules and provisions based on new equipment and technology and updated methods and work practices in line with Bhutan Electricity Authority Safety Code and Safety Regulation 2008, BPC's existing Standard Operating Procedures, Guidelines and Manuals. Policies adopted by the Company which have relevance to loss control/safety management have likewise been also incorporated herein.

The Company's Safety Manual and General Rules & Regulations is being promulgated to ensure and adopt safety culture at work places at all times and for the safety and well-being of all employees of the Company and the general public at large. This revised safety manual places strategic importance on Hazard Identification, Risk Assessment and Risk control to mitigate and eliminate any identified hazards and risks. Further, many of the safety rules and regulations embodied in the revised manual articulate the lessons learnt from previous work accidents and are incorporated to mitigate and prevent recurrences of such accidents. It is only proper, therefore that these rules and regulations be strictly implemented and diligently complied with by all employees.

Lastly, I would like to put on record and commend the Quality and Safety Division of the Human Resource and Corporate Services for putting conscientious effort in coming out with the 2nd edition 2021 of the Safety Manual and General Rules & Regulations.

Tashi Delek!


(Sonam Tobjey)
Chief Executive Officer



INTRODUCTION

As an ISO certified company, Safety and Quality are closely interlinked and integral to the performance of Bhutan Power Corporation in every sphere. BPC's conformance to safety & quality standards will have a serious bearing on the productivity and services provided by BPC to its stakeholders and customers.

Keeping in mind the need to continuously raise the safety standards of BPC and to disseminate critical safety information with the changing time this revised Safety Manual is issued to all employees of the BPC and is designed to protect employees and the general public. Safety has top priority and one should remember that no job is so urgent that safe work habits can be ignored. All of the work we do must be carried out safely in order to manage workplace health and safety and help prevent accidents and it is important to identify, monitor and reduce the risks associated with workplace hazards.

This Safety Manual has been developed in the interest of each employee's personal safety. All employees are expected to familiarize themselves with the Rules, and to comply with them. In case of doubt as to the application of any particular regulation, the Person concerned should ask for explanation or advice from a more senior authority.

BPC regards the safety of personnel as a matter taking precedence over every other consideration in the execution of work; No emergency can justify disregard for the safety of staff. BPC confidently expects the co-operation of the recipients of these Safety Rules in securing the application of the Regulations set out therein. Also, it expects that staff will develop in themselves, and encourage in others, such a concern for safety that the occurrence of accidents will be reduced to the very minimum, and consequently minimize the resultant distress and loss.

The Safety Manual lays down definite rules to be followed in order to minimize danger to human life arising out of accidents associated with work environment.

The rules laid down in this book have been established from experiences by this and other utilities. Study them, understand them and abide by them. Your ideas and suggestions will be retained for inclusion in future revisions. No Safety Manual can cover all of the contingencies that will arise and therefore employees are expected to use good judgment and care in the performance of all duties. The performance of an act in an unsafe manner can create a hazard not only to yourself but to fellow employees, public and to the equipment.

To protect all, Safety must come first.



OCCUPATIONAL HEALTH AND SAFETY POLICY STATEMENT

DECLARATION

The Management of BPC is firmly committed to a policy enabling all work activities to be carried out safely, and with all possible measures taken to remove, or at least reduce, risks to the health, safety and welfare of workers, contractors, visitors, and anyone else who may be affected by our operations.

We are committed to fully comply with the Safety Code 2008 and Safety Regulation 2008 of the Bhutan Electricity Authority of Bhutan and as per the Labor and Employment Act of Bhutan 2007, and relevant Occupational Health and Safety legislations.

RESPONSIBILITIES

Management

In line with the policy BPC Management shall be committed to:

- a) Provide and maintain a safe working environment through recognizing, assessing, controlling and evaluating hazards at workplace periodically.
- b) Provide and maintain plant and toxic substances in safe condition.
- c) Improve emergency management plans/procedures.
- d) Provide and maintain facilities for the welfare of employees and workers.
- e) Provide information, instruction, training and supervision that is reasonably necessary to ensure that each employee/worker is safe from injury and risk to health.
- f) Assign clear roles and responsibilities at different levels in terms of health and safety at work.
- g) Provide a commitment to consult and co-operate with workers in all matters relating to health and safety in the workplace.
- h) Provide adequate budget for occupational safety and health programs, including return to work program.
- i) Integrate health and safety in all decisions including those dealing with purchase of plants, equipment, machinery, material and selection and placement of personnel.
- j) Provide a commitment to continually improve our performance through periodically reviewing policy, regular monitoring and effective safety measurement.
- k) Carry out regular audits/inspections on safe work practice, use of personal protective equipment (PPEs) and their condition.

We ensure that each employee/worker of BPC shall:

- a) Comply with any direction given by management for health and safety.
- b) Comply with safe work practices with the intent of avoiding harm/injury to himself or herself and others and damage to plant and equipment.
- c) Take reasonable care of the health and safety of himself or herself and others.
- d) Wear and maintain personal protective equipment and clothing where necessary.
- e) Not misuse or unnecessarily interfere with anything provided for health and safety.



- f) Report accidents and incidents, no matter how minor, occurring on the job immediately and take corrective measures.
- g) Report all known or observed hazards to their supervisor or manager.

We ensure that contractors, sub-contractors, transporters, other agencies entering the premises of the BPC's undertaking business and visitors shall adhere to the health and safety rules of the BPC.

We strongly confirm our commitment to the safe work practice and safety of our employees, customers and the public at large in our business operation.

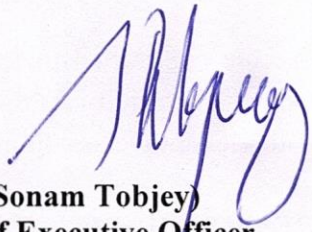
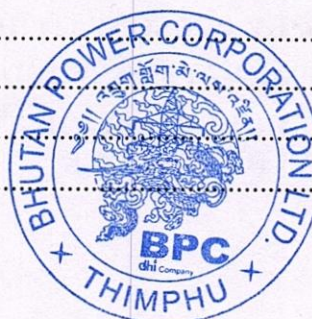

(Sonam Tobjey)
Chief Executive Officer



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DEFINITIONS

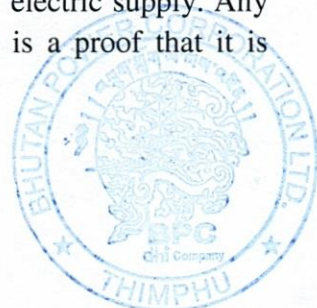
To clarify the intent and meaning of the wording used in this manual, the following definitions are given. Local expressions may not always conform to the wording used in this manual.

1. **Authorization** is the approval for work to proceed on any apparatus under the control of the station In-charge.
2. **De-energized** means (1) Electrically -isolated and at ground potential (2) Mechanically -isolated and at rest, not under pressure different from that of the atmosphere, free from poisonous or explosive gases.
3. **Employee** means all regular and casual workers employed by the BPC regardless of their position.
4. **Apparatus** is all equipment pertaining to the generation, transmission, distribution and use of electric power.
5. **Supervisor or O&M Head** refers to the person in charge of the work and/or working crew. Supervisor is that person, whether he be a maintenance man, construction man or operator, and irrespective of his rank, who is in-charge of work on apparatus.
6. **Safety Observer** refers to a person who is responsible for looking into the safety aspects of a particular work assigned to a team. The Work Supervisor can be the Safety Observer but not necessarily be a Work Permit Holder.
7. **Lines** in the **Electrical** sense: All overhead and underground conductors, used for the purpose of transmitting or distributing electrical energy; also communication lines or cables (OPGW & ADSS). In the **Mechanical** sense: All pipes or conduits used for the conveyance of gases or liquids.
8. **Ground** is a metallic plate or rod buried or driven into the earth, or an extended conducting body connected by such plate or rod to a buried metallic system.
9. **Grounded** means metallically connected to a ground.
10. **Hazard** is any unsafe act or unsafe condition that may lead to injury of persons or damage to property.
11. **Alive Electrically** means: (1) Dynamically - capable of delivering power; connected by means of electrical conductors, transformers etc. to an electrical generator or other source of electrical energy (2) Charged -isolated but not de-energized. **Alive Mechanically** means: (1) Dynamically - connected to a source of dynamic energy such as an air compressor, water or oil pump, a steam boiler or furnace. (2) Charged -under a liquid or gaseous pressure different from that of the atmosphere; in motion; at a dangerous temperature; containing poisonous or explosive gases; or containing energy which is stored in springs.
12. For the purpose of this manual, **male and female genders i.e. 'his', 'her' are interchangeable.**
13. **Nominal Circuit Voltage** is the voltage between the following conductors:
 - a) Any two live conductors of a three-phase line;
 - b) Two live conductors of a single-phase line;
 - c) Conductor and ground of a single-phase line having one conductor normally grounded;



even though such single-phase line connects to a three-phase line.

14. **Shall and must** means mandatory; **should** means recommended.
15. **Work** means any construction, operation, maintenance or repair activity performed during the course of employment.
16. **Station** means the whole of the area within the boundary fence of any property of BPC on which Generating, Transmission or Distribution Plant is situated, including HV rooms and compounds and excluding ONLY such areas (if any) as may be expressly defined as NOT forming part of the Station.
17. **Substation** is any station principally used for stepping up or down the voltage for the supply of power to loads.
18. **Engineer In-Charge** of the Station means the Substation / ESD Engineer or other Engineers or their deputies appointed in charge of the Station. This person may also be referred to simply as "The Engineer In-charge".
19. **Station Operator/Bhutan Power System Operator (BPSO)** is that station which co-ordinates the operation of the generating stations, transmission lines, distribution lines, substations, switching stations or terminal stations in order to assure continuous and satisfactory service to customers.
20. **To Issue Work** means to select the Persons who are to carry out the work and to give them final instructions about the work to be done.
21. **A Competent Person** means a person who in the opinion of the person appointing him has sufficient technical knowledge or experience to carry out safely and competently the duties assigned to him.
22. **To Isolate an Apparatus** means to separate an apparatus from its source or sources of dynamic energy supply at ALL points through which it can receive a supply and in such a way that the supply CANNOT be restored to the apparatus through these points except by DELIBERATE ACTION.
23. **Source of Supply** means any of the source from generation, transmission or distribution of electricity by way of generation, transmission or distribution system respectively.
24. **Low Voltage** means:
 - a) Single phase - 230 volts between phase and neutral
 - b) Three phase - 400 volts between phases.
25. **Medium Voltage** means:
 - a) 6.6kV between phases.
 - b) 11kV between phases
 - c) 33kV between phases
26. **High Voltage** means
 - a) 66kV between phases
 - b) 132kV between phases
 - c) 220kV between phases
 - d) 400kV between phases
27. **Live means:** Actually connected to or liable to be connected to a source of electric supply. Any apparatus which has once been live must be treated as live unless there is a proof that it is disconnected and earthed.



28. **Charged:** a form of being alive.
29. **Discharged** means free from all electrical charge at a potential above or below earth in the immediate vicinity.
30. **Earthed** means connected to the earth by an adequate sized conductor, the contact resistance of which with the general mass of earth is sufficiently low for safety.
31. **Contractor** means any firm, corporation, company, organization or other person or persons contracting to perform any work for BPC.
32. **The Register** means the Register kept as a result of Regulations made by BPC or as a result of Procedures of BPC.
33. **BPC** means Bhutan Power Corporation Limited.
34. **BEA** means Bhutan Electricity Authority
35. **MoLHR** means Ministry of Labour & Human Resources



CHAPTER – 1: GENERAL INSTRUCTIONS

1.1 SUPERVISORS ROLES AND RESPONSIBILITIES

1.1.1 GENERAL

The following are the roles and responsibilities of Supervisors:

- a. Ensuring a safe and healthy working environment under his or her supervision.
- b. Obtaining/returning individual work permits where required for own crew.
- c. Providing or issuing necessary guards, protective equipment and ensuring employees use all the time at work.
- d. Properly maintained tools and equipment.
- e. Ensuring tasks to be performed are planned properly considering the safety and health issues.
- f. Providing and applying general and special safety instructions.
- g. Authorizing only competent employees to undertake high risk task to be performed under his or her supervision.
- h. Ensuring timely intervention of any hazards identified including violation of safety norms and rules or brought to his or her notice.
- i. Ensure regular inspection and monitoring on safety and health.
- j. Ensure safety manual is available at all times.
- k. Conduct Risk Assessment where ever necessary particularly while executing new task, installment of new equipment, change in the work process and use of new equipment.

1.1.2 PLANNING

Supervisors shall be responsible for ensuring execution of any activities under his or her supervision in a safe and healthy manner. Supervisor shall make certain that all the employees under his or her supervision understand the following:

- a. Task to be performed.
- b. Hazards or unsafe conditions that may be encountered.
- c. Proper procedure for doing the work safely.

1.1.3 PERSONAL PROTECTIVE EQUIPMENT (PPE)/PROTECTIVE EQUIPMENT

Each Supervisor shall be responsible for making appropriate protective equipment available and seeing that it is properly used all the time at work.

The O&M In-charge or Work Supervisors are responsible to ensure that all his/her crew members put on necessary safety gadgets and equip themselves with appropriate tools whenever required. When work requiring the use of PPEs the precautions to be taken include:

- a) Inspection and use of PPEs suitable for the work in accordance with suppliers' information and local instructions.
- b) Use only those PPEs that has been appropriately cleaned and maintained, and is free of defects.
- c) Shall also wear suitable clothing and footwear to protect themselves from harm.



All safety gadgets/tools must be of standard quality and procured centrally through the BPC Procurement Services Department (PSD). The concerned Department shall provide clear and comprehensive information after thorough assessment concerning the selection, inspection, use, etc. including the brand/make.

Use of appropriate PPEs in appropriate places include some of the following:

(i) SAFETY HELMETS (Hard Hats)

Safety Helmets, complying with the appropriate standard, shall be worn in all designated areas and any other area where there is a risk of head injury from falling or moving objects. Only non-conducting safety helmets shall be worn especially in areas like Switchyards and electrical installations.

Safety Helmets should conform to (a) Shock absorption (vertical, frontal, lateral and dorsal) (b) Penetration resistance (against sharp and pointed objects) (c) Flame resistance (d) Chin strap attachment (e) Carrier element effectiveness (helmet must not slide from head) (f) Insulating helmets must not contain any conductive parts.

Helmets with elegant designs, adjustable interior harness and comfortable sweat bands with above specific standards should be carefully checked and used properly as given in the instruction manual.

Proper selection of helmets should be made for varying work assignments and also visual inspection should be made for any defect/damage.

For BPC the color of the helmets shall be all white.

(ii) GOGGLES (for Eye Protection)

Precautions to be taken include wearing of goggles and other eye protective equipment in all designated eye protection areas where there is risk of injury to the eyes, including but not limited to injury from an arc caused by an inadvertent short circuit.

In general, Safety goggles with clear and tinted protection against UV radiation and injections of solid particles should be used for protection of eyes.

(iii) HEARING PROTECTION

Employees should take precautions to protect hearing and should have their own individually issued hearing protection where necessary. All employees should wear hearing protection at all times in all designated areas, and where the noise level is above a daily average level of 85 dBA (over no more than 8 hours per day) or a peak of 140dBA. The class of hearing protection depends on the noise level and the duration of exposure to the noise.

Establish work-rest regime for high risk occupational group and monitor use of hearing protective devices like earplugs and earmuffs.



(iv) RESPIRATORS

Employees shall use supplied-air respirators when they are required to work in areas where there is toxic gases, hazardous dusts, fumes or fibres etc. In case the required respirators are not available the place should be cordoned off altogether and instead consultations should be made with experts or higher authorities.

(v) PROTECTION FROM DROWNING

Whenever it is necessary to work where there is a drowning hazard, life jackets and/or safety harness and life lines shall be used.

(vi) SAFETY BELTS (Personal fall arrest systems)

The safety belts, lower body harnesses, fall arrest harnesses, lanyards, energy absorbers, fall arrest devices, anchorage lines etc. shall comply with relevant recognized standards.

- a) The Safety belt and associated materials must be regularly and thoroughly inspected before use and ensure that it is free of any defect.
- b) Faulty PPE shall be withdrawn from service and clearly labelled as defective.

While climbing on the poles the snap hooks and the pole straps should be properly used. The pole strap shall be attached to a secure part of the structure from which it cannot slip off. The straps shall be fastened properly before change of every position on the poles so that free fall will not occur. Safety belts should be used and properly fastened while working on heights and at work places where fall is expected to occur.

(vii) RUBBER INSULATED HAND GLOVES

Rated Insulating Rubber hand gloves should be used for all electrical related works. The gloves must be regularly and thoroughly inspected before use and ensure that it is free of any defect.

(viii) PROXIMITY ALARM

The proximity alarm shall be used and attached/wrapped around the arm by the employees whenever works are to be undertaken near or under live electrical installations.

(ix) SAFETY SHOES/BOOTS

All the employees shall wear rubber insulated safety shoes/boots wherever and whenever works are required to be undertaken in and near the electrical infrastructures and in the construction sites.

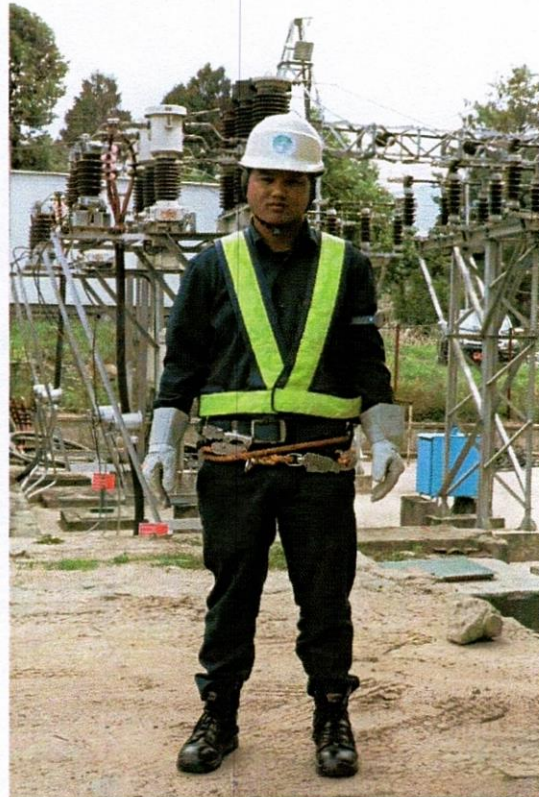
(x) Hot Sticks

The HOT STICKS should be used for all electrical works wherever required.

Note: All the field employees shall put on Safety Gadgets during work and wear proper Uniforms.



The employees SHALL NOT MODIFY THE UNIFORMS PROVIDED BY THE COMPANY OR WEAR CLOTHES OTHER THAN THE UNIFORMS PROVIDED BY THE BPC while on duty or carrying out field assignments/works.



1.1.4 Job Briefing/Tool Box Meeting

Supervisor shall be responsible for proper briefing of employees working under his or her supervision and ensuring that the work is carried out in a safe manner. The following guide will aid the Supervisor in conducting a job-briefing session:

- a. Explain why the job is being done and work methods to be used.
- b. Identify existing and potential hazards where task is to be performed and how to adopt control mechanism based on Hierarchy of hazard control.
- c. Ask for questions and suggestions.
- d. Assign the work.
- e. Make sure all employee fully understand their assignments. If the job involves special hazards, or there is any question as to complete understanding, ask the men to repeat their work assignments and the work methods to be used.





1.1.5 Inspections

Frequent periodic inspections of construction, operation and maintenance of equipment, materials, work areas, work conditions and methods shall be made by Supervisors as a part of their routine duty. Such inspections are essential to prevent incidents which adversely affect the system.

1.1.6 Corrective Action

Power Plants, Offices, Power Line and Substation Supervisors are responsible to take corrective action in matters involving repairs to unsafe equipment and structures.

1.1.7 Safety Committee

The Safety Committee shall be responsible for reviewing, analyzing and assessing the hazards that had occurred or are likely to occur and institute ways and means of controlling such hazards in future by pointing out the lapses and introduce systems that would make each and every employee aware and responsible for their mistakes.

The safety committees shall be formed in the respective dzongkhag service centers and duly approved by the BPC Management along with clear Terms of Reference (TOR). The committees shall hold quarterly meetings but is not limited to just four annual meetings as they can meet as many times depending on the exigencies. The record of discussions shall also be maintained in the form of Minutes of Meeting (MOM) signed by all the members.

Note: The composition, functions and responsibilities of the Safety Committee is clearly defined in the Safety Management System (SMS) and have to be strictly adhered to as per the SMS.



1.1.8 Safety Awareness

The Supervisor shall ensure that employees have understood the works assigned to them and that safety precautions are taken by all the employees working under him and at all times.

1.2 INDIVIDUAL RESPONSIBILITY

1.2.1 General

Your definite responsibility shall be to act so as to provide:

- a. Safety to yourself.
- b. Safety to your fellow employees.
- c. Protection to the public.
- d. Protection to BPC property.

1.2.2 Safety Program

You shall as a part of your job, take an active part in the BPC's safety program and apply it in your everyday work.

1.2.3 Unsafe Conditions

- a. Before attempting any work under conditions, which you believe are hazardous, you shall call these conditions to the attention of the Supervisor and get advice.
- b. Every employee shall report promptly to their Supervisor any dangerous or improper conditions of the equipment, which comes to their attention. The Supervisor in turn shall take appropriate action without undue delay.

1.2.4 Safety On and Off the Job

Many people are injured or killed in accidents in places other than their works places.

- a. While this Safety Manual applies to employees at work, many instructions will help prevent injury and suffering outside working hours.
- b. Follow your Safety Manual and let it help you and your family enjoy safety and happiness 24 hours every day.

1.3 PERSONAL CONDUCT

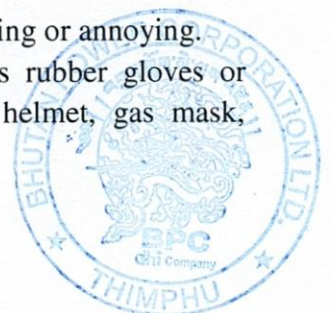
1. Every BPC employee shall be alert and business-like in their work, courteous and considerate in all contacts.
2. Drinking intoxicants and the illegal use of narcotics while on the job is strictly prohibited. No employees shall report for work while under the influence of intoxicants or narcotics, and no Supervisor shall knowingly permit an employee to go to work who is under the influence of intoxicants or narcotics.
3. Practical joking or horseplay while on the job shall be prohibited.



4. No employee shall distract the attention of another worker from their job until it is definitely determined that no danger will result there from.
5. Any employee violating the foregoing requirements of personal conduct, or who unnecessarily endangers their own or others' personal safety shall be subject to disciplinary action as per the BPC SRR in force.
6. Any employee who is unable to perform his duties safely due to illness or other disability shall promptly report his condition to his immediate Supervisor.
7. After absence from work due to serious illness or injury, any employee may be required to pass a physical examination to determine fitness for duty.
8. All injuries shall receive prompt first-aid attention.

1.4 FUNDAMENTALS OF SAFETY

1. Prevention of accidents, injuries and accidents require the wholehearted co-operation of all members of the Corporation. Neither the BPC, the Safety Committee, nor the Safety Manual can prevent accidents without the help of each employee. A capable, mentally alert employee will avoid accidents.
2. Accidents **DO NOT "JUST HAPPEN"** -Accidents are the result of: (a) unsafe acts, (b) unsafe conditions, (c) combination of both.
3. Unsafe Acts which may cause accidents include the following:
 - a. **Operating without Authority or Warning;** such as closing switches without authority, operating hoist and trucks without warning, failure to place warning signs or signal men where needed, failure to block or guard equipment against unexpected movement.
 - b. **Operating or Working at Unsafe Speed;** such as driving too fast, throwing materials or tools to another worker, jumping from vehicles or platforms, running or unnecessary haste.
 - c. **Making Safety Devices Inoperative;** such as removing guards from machines, using oversize fuses, blocking safety valves.
 - d. **Using Unsafe Equipment or Using Equipment Improperly;** such as using dull cutting tools or chisels with mushroomed heads, pipe extensions on wrenches not designed for them, wrong tool for job, or using hands instead of hand tools.
 - e. **Unsafe loading, Placing or Mixing;** such as overloading cranes, winches, slings and chain blocks, leaving objects where they are likely to fall, improper packing, combining chemicals to form a dangerous mixture.
 - f. **Taking Unsafe Position or Posture;** such as working on live conductors from above instead of below, walking under suspended loads or too close to openings, lifting while in an awkward position, entering areas where there are dangerous gases or fumes etc.
 - g. **Working on Dangerous Equipment;** such as cleaning, oiling or adjusting moving machinery and working on live electrical equipment that could conveniently be de-energized.
 - h. **Distracting, teasing, startling** by practical joking, horseplay, quarrelling or annoying.
 - i. **Failure to Use Safe Clothing or Protective Equipment;** such as rubber gloves or sleeves around energized equipment, and failure to use goggles, helmet, gas mask,



respirator, gloves, apron, or leggings when necessary and failure of employees to wear gloves and long sleeved shirts as required by the nature of the work being performed.

j. **Failure to adhere to the Standard Procedure;** such as lockout/tagout and other safety operating procedures put in place for carrying out the work in safe manner.

k. **Inadequate instruction or unclear communication:** Not providing adequate or clear instruction or information on the work condition or hazards.

4. Unsafe Conditions which may result in accidents, include the following:

a. **Unguarded:** Unshielded moving parts of machines, saws, etc.; un-barricaded floor openings and excavation; unenclosed high voltage equipment; non- isolated live circuits; and equipment lacking rubber protective equipment or barriers, etc.

b. **Inadequately Guarded:** Insufficient warning signs, inadequate guards for the job, makeshift barriers, etc.

c. **Defective Material or Equipment:** such as mushroomed chisels, split handles, poorly constructed or weak equipment.

d. **Hazardous Arrangement:** such as due to poor housekeeping, unsafe planning and cramped/inadequate working space.

e. **Unsafe Clothing:** such as jewelry when worn near machinery.

f. **Improper Illumination:** such as insufficient light or unsuitable location producing glare, or objectionable shadows.

g. **Unsafe Design and Construction.**

h. **Improper Ventilation:** such as insufficient change of air or presence of harmful vapor, dust or gas.

i. **Inadequate warning or signs:** lack of signage and information to remind people of safety dos and don'ts.

1.5 ACCIDENT REPORTS AND RECORDS

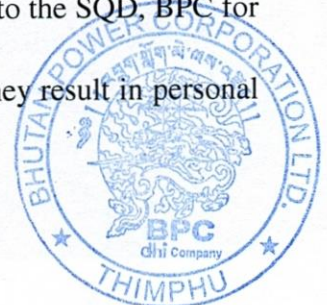
1. Accident records are essential aids to the prevention of accidents. They show the types of accidents most frequently encountered, where they occur and their relative severity. A study of these records will emphasize common hazards, and promote a better understanding of the causes of accidents and the most effective methods for preventing them.

2. Complete and accurate reports of all incidents/accidents must be submitted in the prescribed format as per the Safety Code of Bhutan Electricity Authority (BEA) and Rules & Regulations of Ministry of Labor & Human Resources (MoLHR) to the Safety & Quality Division (SQD), HR&CS, BPC, Thimphu for onward submission to the above mentioned Regulators.

3. Every employee who suffers an injury during his work shall promptly report such injury to his Supervisor.

4. Every accident shall be investigated to determine the cause and what steps are needed to prevent recurrence. It shall be the responsibility of the person in charge of the job to get complete, detailed facts of the accident as soon as possible after it occurs and report it to the SQD, BPC for necessary action.

5. All accidents resulting in lost time injuries and serious accidents, whether they result in personal



injuries or not, shall be promptly investigated by a committee constituted for the purpose and reported to the management. The same shall be shared to all the employees through safety/accident bulletin.

6. All accidents to the public involving BPC personnel, equipment or property shall be reported promptly to immediate Supervisor for necessary action.

Note: *The firsthand information of the accident/incident shall be given to SQD/Concerned Director/GM & CEO via phone call / email / SMS and then followed by a formal report of the particular case to the SQD within 12 hours as per the BEA's reporting format for onward submission to the BEA, MoLHR and concerned offices of BPC. The report submission to the BEA and MoLHR shall be done by the SQD on the next business day provided it does not fall on a week end or government holiday. The procedure for providing accidents reports has clearly been mentioned/highlighted in the Safety Frame Work, 2020 of the Safety & Quality Division (SQD).*

The information regarding the accident shall be disseminated to all the BPC offices through an "Accident Bulletin" soon after the occurrence of such a happening. The Accident Bulletin should contain information like the severity of the accident, all the drawback/default of the people executing the work, and more importantly to make aware of what corrective measures that each and every office and individuals needs to take while they execute similar works in future.

1.6 HOUSEKEEPING

1. One of the best ways to prevent accidents and increase efficiency is to maintain a neat, orderly work place. Workmen are frequently injured by tripping, stumbling, stepping on, or bumping into tools, material and other objects left lying around, or by carelessly placed objects falling from above.
2. The following precautions shall be observed:
 - a. Walks, aisles, stairways, fire escapes and all other passageways shall be kept clear of all obstructions.
 - b. Tools and material shall not be placed where they may cause tripping or stumbling hazards, or where they may fall and strike anyone below.
 - c. Puddles of oil or water create a slipping hazard and shall be cleaned up promptly and the source of the condition controlled.
 - d. Nails in boards, such as those removed from scaffolds, forms and packing boxes, constitute a hazard and shall be removed. The boards shall be carefully stacked or stored or disposed of in a safe manner.
 - e. Nails that have been driven into barrels, transformer crates, kegs etc. shall be removed when opened or uncrated.
 - f. Dirty and oily waste rags shall be deposited in covered metal containers provided for the purpose and disposed of as soon as practicable to avoid a fire hazard.
 - g. Broken light bulbs, glass, metal scraps and other sharp objects shall not be placed in waste baskets, but safely wrapped, plainly labeled and left beside trash containers for removal.



- h. Discarded fluorescent, sodium and other gas filled tubes shall be disposed of safely. Cuts from contact with gas-filled tubes shall receive immediate medical attention. Look for special instructions in or on packing cases.

1.7 PREVENTING FIRES AND EXPLOSIONS

1. Good housekeeping aids to prevent fire. Waste paper, rags and other combustible material shall not be allowed to accumulate.
2. Flammable liquids shall be kept in safety cans with proper labels and kept in identified places.
3. Varnish, paints, lacquers and thinners are highly flammable and shall be stored away from offices and residential areas. Stock of such items shall be clearly marked and signs should be put up to control risks.
4. Similarly 'No Smoking' signs or appropriate warning signs shall be put up where flammable liquids or gases are stored.
5. All employees shall be familiar with the location and proper use of fire extinguishers in their work area.

1.8 HAZARDOUS GASES /PETROLEUM PRODUCTS

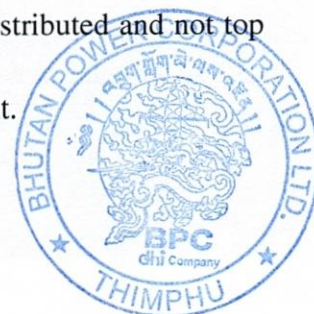
All hazardous gases and petroleum products some of which are mentioned below are procured based on certain requirement. Some of these products are highly combustible while others are inert and non-flammable but very toxic.

- a) Carbon Dioxide (CO₂)
- b) Nitrogen (N₂)
- c) Oxygen (O₂)
- d) Sulphur Hexafluoride (SF₆)
- e) Oil
- f) Grease and
- g) Other combustible materials

The handling of all such products shall be done strictly as per the user manual provided by the manufacturing companies for each type of product. However, the above referred products/materials shall be stored in well-ventilated areas and required sign boards displayed prohibiting smoking and burning of things near such locations. Also all necessary measures like sand, fire extinguishers, water etc. should be made available at all times to combat fire accidents and minimum required medicines (First Aid items) in case of coming into contact with toxic gases.

1.9 STORING AND PILING MATERIALS

1. Material stored in quantity shall be arranged so that the weight is evenly distributed and not too heavy.
2. All stacks and piles shall be protected against overturning or other movement.



3. Sand, gravel, lime, cement and other heavy materials require supports of unusual strength and shall not be stored in buildings unless the supports are designed for the additional weight.
4. Poles, pipes, lumber and similar material shall be stored on suitable racks and safely blocked to prevent their moving.
5. Poles shall not be stored with cross arms, steps or hardware attached.
6. Poles stored along highways shall be placed in a safe position away from the edge of the roadway and blocked, to prevent rolling.
7. All barrels, drums and kegs located inside shall be stored on end or if stored on their side, securely blocked to prevent rolling.
8. All drums located outside shall be stored on their side and blocked to prevent rolling. The pressure of the liquid inside against the plugs of the drum will help keep water from entering the container and contaminating the contents.
9. Material and equipment shall not be stored or located near Substation fences or other enclosures such as main distribution boards, etc. in the interest of Public Safety and the Security of the items concerned.

1.10 LIFTING AND CARRYING

1. Most lifting accidents are due to improper lifting methods while lifting heavy loads. When lifting heavy objects, the back shall be kept close to vertical and the lifting done with the leg muscles which are large and strong.
2. Bulky loads shall be carried in such a way as to permit an unobstructed view ahead.
3. When two or more men are lifting or pulling together, one man shall give the signals for the group.
4. Pipes, conduits, reinforcing rods and other conducting materials shall not be carried on the shoulders near exposed live electrical equipment or conductors.

1.11 LADDERS

1. All ladders shall be inspected at regular intervals and maintained in a safe condition.
2. Foldable ladder should be made available to carry it to the far flung places or in the forest as the risk of touching the overhead lines will be reduced.
3. Split, broken or defective ladders should not be used. Defective ladders should be scrapped.
4. All portable ladders shall be equipped with suitable safety feet. Where safety feet do not overcome the hazard of slipping, the ladder shall be securely held in place by tying or by a man at the base of the ladder.
5. The base of the ladder shall not be placed less than 1/4 of its length from a wall or supporting surface and not farther away than 1/3 the length unless securely held or tied in place. Step ladders shall be fully open while being used.
6. To prevent collapse of extension ladders, the minimum overlap of section shall be:
 - a. 1 m on ladder up to 11.5 m
 - b. 1.2 m on 12-13 m ladders and on 3-section ladders above 14 m
 - c. 1.5 m on 2-section ladder above 14 m
7. Ladders placed near doors or in passageways shall be protected against being struck by doors or



traffic.

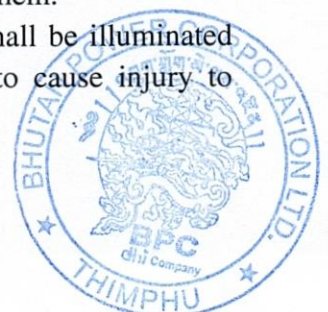
8. While going up or down a ladder, always face the ladder and use both hands for climbing.

1.12 HAND TOOLS

1. Many accidents result from improper use of tools and use of defective/uninsulated tools and equipment. Employees shall use only tools and equipment which are in good condition. Defective tools observed at work site shall be reported to the supervisor and replaced.
2. Tools which develop defects while in use shall be removed from service and not used again until replaced with good one.
3. Impact tools such as chisels, drills, hammers and wedges with mushroomed heads shall not be used until they have been reconditioned/replaced.
4. Hammers, axes, shovels, swords and similar tools shall not be used if handles are loose, cracked or splintered.
5. Defective wrenches, such as open-end and adjustable wrenches with spread jaws, or pipe wrenches with dull teeth, shall not be used as they are likely to slip.
6. Pipe or other extensions shall not be used on a wrench handle to increase the leverage unless the wrench is specifically designed for use of such extensions.
7. Portable electric tools shall be equipped with a 3-wire cord having the ground wire permanently connected to the tool frame and means for grounding the other end. Double insulated tools are also acceptable. Ground fault protection shall be used wherever possible.
8. Metal rules, metal tape lines, or tape lines containing metallic material shall not be used around exposed electric conductors or equipment.
9. Sharp-edged or pointed tools shall have the edge or point guarded at all times when not in use.
10. Files or other tools with pointed tongs shall be equipped with suitable handles.
11. Bent digging bars present a hazard and should sharpening or straightening be required by heat, it shall be done by a blacksmith or someone familiar with the process. Worn out bars shall be scrapped.

1.13 SAFEGUARDING THE PUBLIC

1. Every possible 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.
2. 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.
3. 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.
4. 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.
5. When work is carried out during the night and in 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.

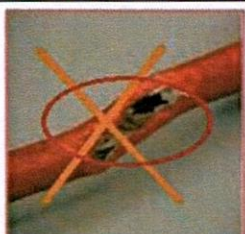
6. Timely maintenance of equipment and structures shall be carried out as per O&M manuals of DCSD and TD.

BHUTAN POWER CORPORATION LIMITED

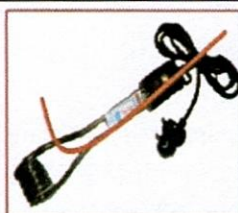
ELECTRICAL SAFETY TIPS



Install **ELCB/RCCB** in your house to **protect yourself** from **electric shocks** while handling electrical appliances.



Do not use damaged cables in service. It should be **repaired or replaced** immediately by a competent person. **Do not touch** or connect the **damaged electrical appliances**.



Use **standard** immersion water heater in a **plastic bucket** and not the home-made immersion water heater. **Unplug** the heater to check if the water is hot.

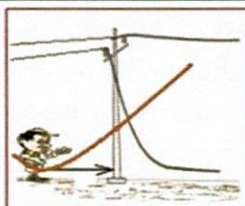


Do not construct houses or structures under or near electrical lines as it **cause danger** to life and property. Houses constructed below the power lines are **subjected to lightning strikes**.



Please **seek advice** from BPC local office if you wish to use **PORTABLE GENERATOR** in your premise during power supply outage.

Inappropriate use of portable generator could **cause HAZARDS** as power can flow back to BPC system.



Always assume stray wires to be live and **stay away** from it. If you see a **fallen electrical wire/cable**, stay away and **call BPC at 1250(TOLL FREE)**.



Do NOT cut down trees near power lines. It could fall on power lines and lead to **fatal accidents**. **Watch out** for power lines before you climb a tree. You may get **electric shock** from the leakage current.



Watch out while using ladders for overhead wires and power lines. **Do not** lean ladder on the overhead wires and power cables.

For Further information, contact : BPC at safety@bpc.bt



1.14 PROTECTIVE EQUIPMENT AND MATERIAL

All protective equipment outlined under clause 1.1.3 shall be used appropriately by the employees whenever and wherever required and who may be exposed to hazards.

1.15 WELDING, BURNING, CUTTING (GENERAL)

1. The primary hazards encountered during welding are electric shock, burns, radiant energy, toxic fumes, fire and explosion.
2. Personal contact with the electrode or other live parts of electric welding equipment shall be avoided. Alternating currents are dangerous even at low voltage.
3. Avoid burns from electric arcs, gas-welding flames, hot slag, or touching welded parts before they have cooled.
4. Gauntlet gloves shall be worn while welding or cutting. Outer clothes shall be free from oil and grease. Clothing around neck, wrist and ankles shall be fastened at all times. In confined areas, flame-retardant clothing may be needed. Hot material shall be cooled or plainly marked before leaving it unguarded.
5. Suitable goggles or welding helmets shall be worn for protection while welding. Barriers shall be erected to protect other persons from rays of electric arc or welding flame. Ultra-violet, infrared and excessively bright visible-light rays are injurious to eyes.
6. Adequate ventilation shall be provided while welding in confined spaces or while brazing, cutting or welding any zinc, brass, bronze, galvanized or lead coated material. Poisonous fumes may be generated during the welding process by metallic oxides, coating on the material being cut or welded, or by the electrode or flux rod.
7. Never use a cutting or welding torch where there is danger of starting a fire. Move work, if practicable, to a location where possibility of starting a fire is not likely. Danger of fire always exists when welding near flammable material or explosive gases.
8. Where flammable material cannot be removed from exposure to sparks, it shall be protected by a barrier of sheet metal or other suitable material and a fire extinguisher kept handy.
9. When welding or cutting in elevated position, precautions shall be taken to prevent sparks or hot metal falling onto people or flammable materials.
10. Before welding or cutting a pipe, tank or container that has held flammable material, the following procedure shall be observed: Drain it, thoroughly steam out and fill container with water or thoroughly wash the container with a caustic solution and spray sufficient neutralizer into the container to fill it with non-explosive vapor.
11. Welding or cutting shall not be attempted in dusty or gaseous areas where there is danger of causing an explosion.
12. Whenever combustible materials have been exposed to molten or hot slag for cutting or welding operations, a worker shall stay at the place of work for at least one-half hour after completion to make sure that smoldering fires have not been started.



13. Cutting of welding shall not be performed where an open flame would be dangerous, as in or near rooms containing flammable vapors or liquids, or exposed loose combustible material.
14. Welding shall not be performed on lined tanks.

1.15.1 ELECTRIC WELDING

1. Approved helmet with the proper-shade glass shall be worn by welders and helpers to protect the eyes and face. Clear goggles shall be worn under the shield to protect against flying particles of scale when the shield is raised or while chipping slag.
2. When changing electrodes, keep them insulated from ground or other nearby metal objects.
3. Never permit the metal part of an electrode, the electrode holder or the electrode insulation to touch the bare skin.
4. Electrodes shall be removed from the holder when not in use to eliminate the danger of electrical contact with persons or conducting objects. Electrode holders when not in use shall be so placed that they cannot make contact with people or strike an arc to a grounded object.
5. Operators shall check their equipment regularly to see that electrical connections and insulation of holders and cables are in good order.

1.15.2 SOLDERING

1. Wet solder or a wet ladle shall never be put into molten solder.
2. When using solder pots, a barrier shall be erected to prevent their being knocked over.
3. Bystanders shall not be allowed near men working with molten metal as referred to earlier in this section.
4. Small soldering jobs can be done most satisfactorily with soldering irons or guns.
5. When torches solder pots, Prestolite tanks and other open-flame devices are used for soldering, goggles and leather-palmed gloves shall be worn.

1.15.3 POWER CHAIN SAW OPERATIONS

The following is the procedure for taking safety measures for power saws:

1. One-Man Power Chain Saws
 - a. Study the handbook for your saw.
 - b. Lift properly to avoid back strain.
 - c. Maintain a firm grip and handle the saw so that you have safe control at all times.
2. Before you start the motor, make sure the saw is not touching anything.
3. Instructions shall be given to workmen by the Supervisor when using saws for the first time.

1.15.4 GRINDERS

1. Safety goggles or eye shields shall be used when operating grinder.
2. Portable grinders shall not be used in close proximity to other workers unless protected.
3. All grinders shall be equipped with the proper stone for size and speed of unit.



1.16 BATTERY AREA

1. Smoking or open flames shall not be permitted in a battery area, and **"NO SMOKING"** signs are to be posted.
2. The battery charger shall be shut off when making adjustments to terminals or other connections.
3. When making electrolyte for lead acid storage batteries, always pour the acid into the water. The reverse method may cause an explosion. Suitable goggles or face shields shall always be worn when making electrolyte.
4. The defective batteries in the battery bank shall be replaced with standard batteries.
5. Smoking and use of matches or other open flames shall not be permitted in battery rooms or while inspecting, filling, testing or handling batteries.

1.17 SPRAY BOOTH OR SPRAY PAINTING IN CONFINED AREAS

1. Smoking shall not be permitted in a spray booth and signs indicating **"NO SMOKING"** shall be posted.
2. Fire extinguishers shall be inspected regularly, kept fully charged and easily accessible.
3. Open flames shall not be permitted while spray painting is in progress.

1.18 POWER MOWER EQUIPMENT

1. When operating power mower equipment, employees shall:
 - a. Remove wire, stones, branches and other foreign objects from area to be moved. Rocks and tree roots shall be avoided.
 - b. Keep hands and feet from under the machine and out of discharge chute while the engine is running.
 - c. Stop engine (or motor) and disconnect spark plug wire or supply cord on electric mower before adjusting, repairing or replacing cutting blade or storing mower. If the equipment being used is of the rotary type, special attention shall be given to the condition of the blade mounting bolt or nut before use.
 - d. Motor of gas driven machines shall be allowed to cool before re-fueling and any spilled fuel to be wiped up before starting mower.
 - e. No extension cord in size 16 Amp WG or smaller shall be over 31 meters in length.
 - f. Electric mowers shall only be operated where 3 pin receptacles are available or ground fault protection is provided.
 - g. When mowing a terrace, slope or incline, mow lengthwise (across the face of the slope etc.) instead of up and down.
 - h. Use extreme caution when pulling a hand mower toward feet.
 - i. Safety footwear, long trousers and shirts shall be worn when operating mower.



FIRST AID TREATMENT

ELECTRIC SHOCK



Step 1:

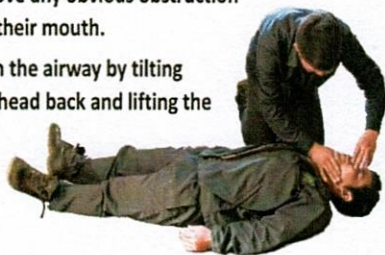
- » Turn the power off at the mains.
- » Push the casualty away from source using non-conductive items such as the safety hook, broom or chair.
- » If this is not possible stand on a dry insulated material such as newspapers, books or rubber matting.

Step 2:

- » Check the casualty response-if they respond by answering or moving, providing they are in no further danger, leave them in the position you found them.
- » Check for visible injuries and call for an ambulance.

Step 3:

- » -Remove any obvious obstruction from their mouth.
- » -Open the airway by tilting their head back and lifting the chin.



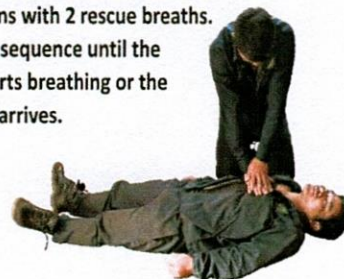
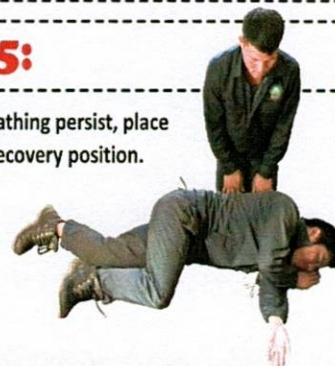
Step 4:

- » Check for signs of breathing by looking for the chest movements, listen at the mouth for breath sounds and feel for air on your cheek. Look, listen and feel for 5 seconds



Step 5:

- » If the breathing persist, place them in recovery position.
- » If the breathing is absent commence CPR, whilst waiting for the ambulance. Alternate 30 chest compressions with 2 rescue breaths. Repeat this sequence until the casualty starts breathing or the ambulance arrives.



CHAPTER – 2:OFFICE SECTION

2.1 OFFICE SAFETY

1. Office work is generally considered relatively safe but hazardous conditions and unsafe practices occur that can cause accidents.
2. The general section of this manual, therefore, applies as much to office workers as to the other employees of the BPC.

2.2 RULES AND GUIDES GOVERNING GENERAL OFFICE PRACTICES

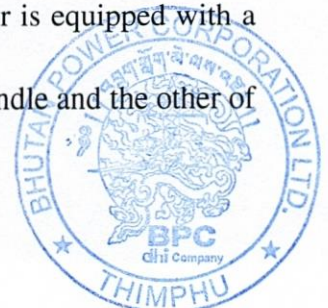
1. Employees should not run in the passageways, corridors or on the stairs.
2. No employees shall place obstructions or temporary obstacles such as briefcases, chairs etc. in the aisles, corridors or stairs.
3. Water, oil or other liquid spilled on the floors presents a dangerous slipping hazard and shall be cleaned up at once.
4. Employees going up or down stairways shall keep one hand free for use on handrail.
5. Employees should always keep to the right when walking - particularly at blind corners.
6. No employee shall have cords strung across aisles or walkways where people may trip or fall over them. Those for telephones, adding machines, computers etc. should be coiled, fastened out of the way or covered by a protective covering.
7. Rubber mats in hallways should be properly secured.
8. Where floor surface is treated it should be done with a slip resistant preparation.
9. Loose objects such as matches and pencils should not be left on stairs or floors as they may cause slipping and falls.
10. Open desk or file drawers and desk lids constitute a serious hazard as persons may strike or fall over them.

2.3 LIFTING AND CARRYING

1. Lifting boxes and bundles of office supplies, ledgers, portable filing cases and office machines can cause serious strain unless done with the back erect and making use of the more powerful leg muscles.
2. Large boxes or bundles of supplies shall be moved by a hand truck or unpacked and delivered in small parcels.
3. Bulky objects shall not be carried in such a way as to obstruct the view ahead, or interfere with free use of handrails or stairways.
4. Always get help when carrying or lifting heavy or awkward articles.

2.4 DOORS

1. Doors should be opened slowly to avoid striking anyone on the other side of it.
2. The door handle should be used to open or close doors particularly if a door is equipped with a glass panel.
3. Use proper care when closing safe and vault doors. Place one hand on the handle and the other of



the dial when closing vault doors.

4. Report loose handles, burrs, rough or sharp edges on doors.

2.5 PILING

1. Employees shall use a set of steps or a ladder when required to obtain or place material from or onto a high place.
2. Avoid reaching beyond your capacity or balance.
3. Avoid storing heavy ledgers, binders etc. above or below approximate waist height.
4. Material shall not be piled too high for stability or in a haphazard way.

2.6 SHARP INSTRUMENTS

1. Knives, scissors, letter openers, pens, pencils, etc. should be kept in the front of the desk drawer where they can be seen when the drawer is opened.
2. Razor blades shall not be used unless fastened in a proper holder.
3. Watch the fingers when using staples, punchers or paper cutters.
4. Never carry pens, pencils, scissors, knives, etc. with points exposed.
5. When fastening paper, clips or staples should be used, never use pins.
6. Persons working in filing sections should use rubber finger guards to prevent cuts from metal fasteners or paper edges.
7. Immediate first-aid treatment is essential for all cuts and puncture wounds no matter how small.

2.7 WINDOWS

1. Proceed with caution when opening or closing windows.

2.8 LADDERS

1. Employees shall exercise extreme caution when filing, etc. in locations which require the use of small ladders or stands.
2. Ladders etc. should be examined before use; treads and feet should be provided with non-slip materials.
3. Ensure that brakes on rolling and trolly-type ladders are in serviceable condition.

2.9 FIRE PREVENTION

1. No employee shall smoke in forbidden areas designated by "NO SMOKING" signs.
2. All BPC buildings should have fire exit doors to provide a clear, safe way to evacuate a building in case of a crisis or disaster.
3. No employee shall hinder access to fire extinguishers or fire exits.
4. Employees discovering fires which they cannot extinguish themselves shall contact the Security and Fire Services Bureau (SFSB)/local fire Department.
5. All BPC offices should have designated assembly points during emergencies.
6. All employees should exercise good housekeeping habits -not allowing waste paper, rags or other



combustible material to accumulate.

7. Employees should exercise extreme caution when extinguishing matches.
8. Every employee should know the location and proper use of the various types of fire extinguishers.
9. Every employee should know the fire exits associated with their particular job location.
10. Exit areas/corridors must be kept free of obstructions at all times.
11. All employees must ensure to remove the heaters, boilers and other power consuming equipment from the power sockets when not in use.

2.10 OFFICE EQUIPMENT

1. Each employee shall report promptly to their Supervisor for any dangerous or improper condition of BPC's office equipment which comes to their attention.
2. No employee shall leave a filing cabinet or desk drawer open and unattended.
3. Glass:
 - a. Broken glass shall not be placed in waste baskets.
 - b. Broken glass shall be wrapped in heavy paper marked "Broken Glass" and placed alongside the waste basket so that persons removing wastepaper will not be cut accidentally.
 - c. Damaged metal waste baskets with exposed sharp edges or points shall be repaired or replaced immediately.
 - d. Exposed sharp points on wire or metal mail baskets shall be repaired or replaced immediately.
4. Power Driven Office Machines:
 - a. All exposed moving parts of power driven office machines shall be covered with suitable guards.
 - b. All office machines should be equipped with a grounded plug suitably connected.
 - c. Any suspected defects in the cord, plugs and switches shall be reported to the Supervisor who will see that the necessary repairs are made as quickly as possible.
5. Operators of power driven office machines shall be instructed in their safe use and upkeep.
6. Loose sleeves clothing and jewelry shall not be worn while operating power driven machines.
7. Storing Machines:
 - a. Employees should know the correct procedure for taking out and putting away these machines in the desk compartment.
 - b. The desk closing mechanism should be inspected periodically and any defects reported to the Supervisor.
8. Filing Cabinets:
 - a. Filing cabinets shall be properly balanced or anchored.
 - b. The upper drawer of a filing cabinet shall never be overloaded nor shall more than one upper



drawer be opened at a time.

- c. When closing a filing cabinet drawer care shall be taken to see that hands are held against face of drawer to avoid fingers being caught.

9. Furniture:

- a. When realigning desks, tables etc. care shall be taken to avoid injury to fingers or hands.
- b. When splinters or loose veneer occur on desks or chairs, your Supervisor shall be notified so that the condition can be rectified.
- c. Look out for glass tops and pencil sharpeners protruding beyond the end of desks.
- d. When closing drawers of desks, care shall be taken to see that hands are held against face of drawer to avoid fingers being caught.
- e. Razor blades and other sharp objects shall not be left loose in drawers.

10. Safety tips

- a. Employees should assume proper posture while sitting on spring tension chairs.
- b. Chairs should be nested in desk or out of the way when not in use.
- c. Non-tilt chairs should not be tilted.

- 11. Electric fans shall be secured on a firm foundation and located in such a position that employees will not be required to get too close to them.

12. Paper Cutter:

- a. While in use, the fingers of the free hand shall be kept away from the cutting edge of the paper cutter.
- b. Cutting knife shall never be left in the raised position while unsupported but shall be kept closed when not in use.

- 13. All dollies and hand-trucks should be equipped with proper casters for easy maneuvering.

2.11 WORKING IN OUTSIDE AREAS

- 1. Office workers called upon to conduct physical verification of inventories etc. in the operating areas of the Company shall observe the rules of that particular area e.g. eye protection, safety hats, no loose sleeves, ties, clothing and shall not climb on bins, piles etc.

Note: The guidelines stated under Clause 1.6 "House Keeping" also needs to be referred to when it comes to Office Safety aspects.



CHAPTER - 3: ELECTRICAL OPERATIONS

3.1 AUTHORIZATION FOR DOING WORK

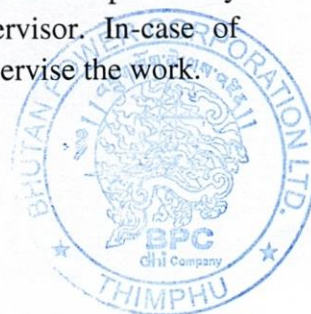
1. Maintenance, repair and construction on electric circuits or equipment shall not be done until after making sure that working conditions are safe and obtaining proper authorization for doing the work.
2. "Proper Authorization" means both the notification by the person in charge that a particular job is to be done and also the approval by the person or persons responsible for the equipment to be worked on.
3. Crew supervisor/O&M Head shall be responsible for seeing that proper authorization has been obtained for all work done under their supervision.
4. No man shall begin work on any circuits or equipment until instructions are given by the supervisor to do so.

3.2 WORKING CONDITIONS FOR MORE THAN ONE MAN

1. On all jobs a sufficient number of men should be present to do the work safely. The number of men required shall be determined by the supervisor/O&M Head in charge of the work.
2. On some hazardous work it is not desirable for one man to work alone even though he might do so if he were careful and observed proper precautions. The supervisor shall determine when additional men are needed to protect workmen against accidents or to render assistance in case of unforeseen circumstances.
3. On especially hazardous jobs where close clearance or difficult working conditions are encountered, an observer may be required. On any job which, in the opinion of the supervisor, requires an observer, the supervisor appointed by him shall act as observer. The observer shall not engage in any activity that the supervisor considers will interfere with the duty of the observer.
4. When work is done on energized overhead circuits at least two workmen; one of whom shall be a qualified employee (any regular employee with sufficient experience), shall be assigned to the job; the other workman may be on the ground close by and equipped and qualified to render immediate assistance should it be required. The assignment of the second employee to do this work shall be based on his qualification and ability as assessed by the supervisor, on consultation with the qualified employee.

EXCEPTIONS: This rule shall not apply to the fusing of transformers where such transformer fuses are accessible without passing appliances or reaching past electrical wires or appliances carrying more than 230 volts, nor shall it apply to work done with special tools which are designed for the purpose and which are used by workmen who have been trained in their use.

5. When stringing or removing wire alongside or above energized primary, at least one qualified lineman or experienced ground-man shall attend the reels.
6. Tree trimming/felling (ROW) along transmission or distribution lines where there is a possibility of contact with the line shall be done under the supervision of a supervisor. In case of outsourcing the work to the third parties, BPC shall depute an employee to supervise the work.

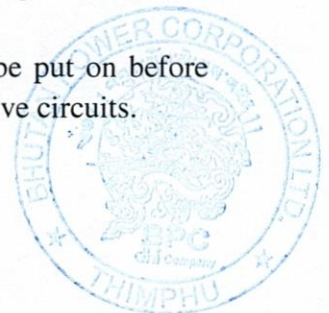


3.3 USE AND CARE OF RUBBER EQUIPMENT

1. Rubber goods such as gloves, sleeves, blankets and hose are suitable for temporary protection on circuits rated up to 33,000 volts. Barriers of solid material are sometimes preferable as they are more difficult to displace than flexible rubber.
2. All rubber goods shall be of high grade material, and carefully inspected, stored and cared for.
3. When not in use, rubber should be shielded from sunlight, heat, ozone and oil.
4. Rubber will age or oxidize quickly at points of distortion. Rubber gloves should not be worn wrong-side out or left in that condition as this will cause cracking of rubber. Blankets should be rolled rather than folded when not in use. Line hose and insulator hoods should be stored in this natural position.
5. Rubber will take a permanent set if kept in one position for long periods and will deteriorate from non-use. Where large quantities of rubber goods are carried on a truck, they should be rotated so that all items will be regularly used.
6. All rubber protective equipment shall be given careful visual inspection at monthly intervals and also before use.
7. Non-standard rubber gloves must not be used for electrical works.

3.4 USE OF RUBBER GLOVES

1. Mostly fatal accidents in the electric power industry are electric- shock and burn cases, and the outstanding type involves contact with the hands. Most accidents of this type can be prevented by the simple practice of wearing rubber gloves at all times while within reach of energized wires or equipment at primary voltage.
2. Rubber gloves shall be worn during the following operations and conditions:
 - a. Working on 0-400 volts where safety requires gloves because of the presence of grounds, moisture or other conditions.
 - b. Working on series street-lighting circuits.
 - c. Working on de-energized street-lighting circuits over 400 volts unless they are known to be short-circuited and grounded.
 - d. Using switch sticks under damp or adverse weather conditions.
 - e. Stringing and sagging conductors in the proximity of circuits or working near circuits that are alive at potential in excess of 400 volts.
 - f. Attaching and detaching leads when using a telephone test set.
 - g. Controlling poles with tools in the proximity of live circuits.
 - h. Connecting or disconnecting lightning arrestors, transformer and other equipment grounds.
 - i. Within reaching distance of over 400 volts.
 - j. When operating air break switches and group-operated disconnecting switches not protected by a standard ground mast installation.
 - k. When short-circuiting terminals of capacitors.
 - l. In addition to the above, rubber gloves shall be used any time the man in charge of workmen considers it desirable or necessary.
3. When preparing to work on live above 400 volt circuits, rubber gloves shall be put on before reaching the working area and must be kept on until safely out of reach of such live circuits.



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 should be strong/sturdy and must safely hold men and material required for working.
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.

3.8 HOT LINE TOOLS

1. Live lines and equipment operated above 400 volts shall be worked only when de-energized and grounded, or with approved hot-line tools.
2. When live line work is carried out on lines or equipment, arrangements shall be made to prevent the circuit being re-energized after a trip-out until the crew has been contacted.
3. Live line work shall be carried out:
 - a. Only with approved and tested hot line tools and equipment designed and constructed solely for the purpose.
 - b. Only during favorable weather conditions and visibility. Live line work shall not be done during rain, fog or lightning.
 - c. Only crews trained for the type of live line work which is to be performed, or by crews under the direct supervision of a trained person.
 - d. Using approved hot-line procedures only.
4. When working with 'hot line' tools, care shall be taken to see that workmen keep a safe distance from all live parts. Where necessary due to close clearance, suitable barriers shall be erected.
5. A live conductor, on load at a potential in excess of 230 volts to ground and the neutral conductor associated with distribution circuits shall not be cut or disconnected until it has been bypassed with a jumper capable of carrying the load.
6. Live line tools, shall be transported and stored in a manner which provides protection from weather and mechanical damage.
7. Live line tools shall be inspected regularly for cracks, insulation strength, and functionality test by the Supervisor or an employee delegated to such duty.
8. Live line tools shall be kept free from dirt and moisture and shall not be laid directly on the ground.



3.9 WORKING ON DE-ENERGIZED LINES/EQUIPMENT

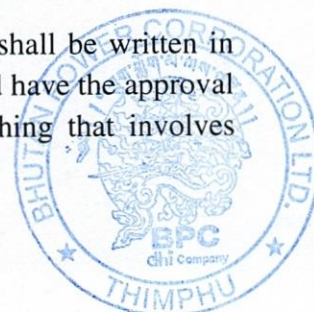
1. Prior to commencing work on de-energized Medium and High Voltage electrical equipment, isolation and earthing shall be applied to prevent hazard from causes that include but are not limited to:
 - a. Inadvertent reconnection to the supply;
 - b. Interconnection with other parts of the power system or any other power system such as a back feed from a transformer;
 - c. Stored charge in capacitors, power cables and bushings;
 - d. Induction from adjacent circuits, atmospheric conditions or direct lightning strike and
 - e. Back feed from secondary circuits such as voltage transformers/Diesel Generator (DG) sets. BPC must have clear cut Standard Operating Procedures with the DG operators to prevent back flow of power to avoid electrical accident.

This may require isolation and earthing to be applied at a number of points around the equipment to be worked on, and not only at the point at which it is normally energized.

2. When disconnectors or other equipment are used to form isolation points for plant and equipment on which a work permit is to be issued, the equipment shall be:
 - a. Locked in the open position where practicable; and
 - b. Tagged.
3. Earth switches or other dedicated earthing equipment shall be used where available but should not be relied on to protect a worksite unless:
 - a. The earth switch is locked in the earthed position and Tagged; and
 - b. The earthing equipment is visible from the work site.
4. Where the earthing point is not visible from the work site, properly designed portable earth connections shall be applied. All phase and neutral conductors shall be bonded together and connected to earth. It is not acceptable to earth only the conductor being worked on or to provide a separate earth connection for each conductor.
5. Conductors shall be proven de-energized on all phases prior to the application of portable earths to any set of conductors where an earth is not visible on those conductors at that location.
6. For work on overhead lines, standard portable earths shall be applied on both sides of the work location. One set of earths shall be placed as close as possible to the work site and shall be visible from it.

3.10 TAKING CLEARANCES

1. All switching procedures for the purpose of giving or taking clearances shall be written in advance on the approved form; all scheduled switching shall be written and have the approval of the Competent Authority before the switching is commenced. Switching that involves



transmission lines/equipment shall be cleared through the Bhutan Power System Operator (BPSO), using procedures as given in the Grid Code under the "General Rules and Operating Regulations".

2. No work shall be done on lines or equipment where clearance is required for safe conduct of the work until clearance has been properly secured and checked. Operating instructions shall be followed in addition to the procedures outlined herein.
3. All circuits and equipment shall be considered alive at full voltage until cleared by the BPSO, the dispatching authority and concerned switching operators/managers in case of Division Offices.
4. Lines and equipment where work is to be performed shall be cleared only upon the request of the O&M In-charge/ Supervisor who will be the Permit Holder or In- charge of the work.
5. The O&M In-charge or Supervisor shall personally take and give clearance and shall not delegate this function to his workmen or others.
6. A person requesting clearance shall properly describe to the operator the equipment to be cleared by identifying the circuit or equipment by name, number and description. The information shall be repeated by the system/substation operator to the person making the request before starting clearing and again when clearance is completed.
7. Where instructions must be given by Mobile, each speaker shall give his name and personal number and must satisfy himself as to the identity and authority of the other person before carrying out any instructions.
8. In granting clearances on station buses or equipment, the operator shall caution the man receiving clearance regarding any close clearance, hazard or unusual conditions known or suspected to exist.
9. At an attended station, no one but the operator in charge shall clear circuits or equipment.
10. When clearing electric circuits, breakers or equipment to work on them, the breaker and all their disconnecting switches shall be opened in the following order:
 - a. Check to see that the by-pass switch, if any, is locked open and tagged by placing a "Men at work" tag in parallel with the lock.
 - b. The circuit breakers shall be opened, checked to see that it is open and tagged by placing a "Men at work" tag on the control switch. Remotely controlled equipment shall be tagged at the control panel in addition to tagging in the sub-station.
 - c. Then the disconnecting switches shall be opened.
11. All disconnectors and air-break switches shall be checked to see that all blades are in full-open position. Gang-operated or motor-operated disconnectors and air- break or Load break switches shall be blocked by locking in the open position. If motor-operated, the motor mechanism shall be disengaged.
12. Grounding switches under the control of the operator shall be operated only under his direction and before he grants clearance.
13. Equipment shall not be considered cleared until it has been tagged with a "Caution Notices".
14. After clearance has been given by the operator, the Permit Holder personally shall check the clearance by one or more of the following methods:
 - a. Electrically (if possible)
 - b. Visually (open switches, grounds etc.)
 - c. Inspection of "Man at work" tags.



- d. Personally with the operator.
15. Where these personal checks are not possible due to the Permit Holder being remote from the clearing point, the Permit Holder shall check the clearances with the system/substation operator by telephone/mobile and through voltage detector, before starting the work.
 16. An operator shall de-energize any line or equipment which is reported in serious trouble by a responsible person and shall not re-energize same until adequate assurance has been obtained that no life or property hazard exists.
 17. When circuits are taken out of service and they are controlled by breakers, the mechanism shall be placed in the racked out position or disconnecting devices opened and the breaker control switch tagged with a "MEN AT WORK" tag. If the circuit is controlled by a fuse only, the fuse holder or cartridge shall be removed from the disconnecting device and the line tagged with a "MEN AT WORK" tag.
 18. Whenever a circuit is to be worked on while energized, the breaker or re-closer controlling the circuit shall be set for non-reclosing operation and a "DO NOT OPERATE; MEN AT WORK" tag placed on the circuit to prevent reclosing in the event of trouble.

3.11 MULTIPLE CLEARANCES

1. Clearances should be requested for each piece of equipment required for safe performance of the work.
2. Where two or more crews are working independently on the same line, each supervisor/work In-charge shall secure his own clearance in the prescribed manner and each crew shall properly protect themselves by placing their own temporary grounds.
3. On a job requiring several crews, such as a cutover, one person may be designated to take and give up clearance for all crews. In such an event, each crew work In-charge or Supervisor will then receive and give up his clearance to the person so designated.

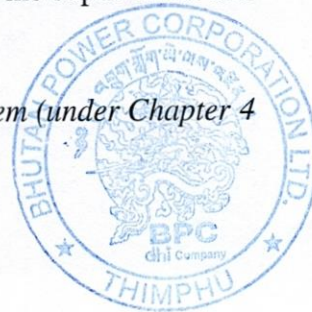
3.12 TRANSFER OF WORK PERMITS

1. Work Permits shall not be transferred from one person to another. Only the person actually receiving the clearance shall return the clearance.
2. If the "work permit" holder must leave before the commencement of work, he shall surrender the permit and a new one shall be issued to another appropriate person.

3.13 RETURNING OF WORK PERMIT

1. Before returning of work permit, each Permit Holder shall make certain that all his men are safe, clear and that the equipment is in good condition and also that all temporary grounds placed by them have been removed.
2. All tools, temporary grounds and other equipment used on the job shall be accounted for before giving clearance or returning the work permit.
3. Grounds under the control of the operator shall be removed only under his supervision and before the equipment is returned to service.

The Work Permit procedure is clearly substantiated under the Work Permit System (under Chapter 4



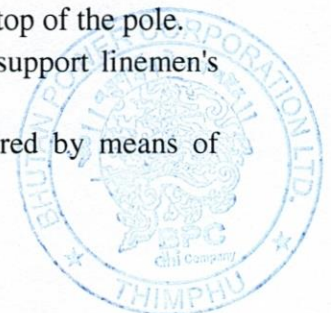
clause 4.1.1).

3.14 HANDLING POLES

1. From the time a pole is received at the pole yard until it is finally disposed of after its useful life, it is potentially dangerous accident factor unless proper safety precautions and work procedures are followed.
2. Several satisfactory methods for safely unloading poles from the trucks exist but the Supervisor shall determine which method is best for existing conditions after taking into consideration the type of truck, the location and condition of the unloading site, the size of the poles and whether they are uniform size and class, or mixed.
3. Before any work is started on a vehicle load of poles, the brakes shall be tightly set and the wheels blocked to prevent movement of the vehicle.
4. When unloading or loading poles, men should work at the ends of the poles whenever possible, so they will not be injured by movement of the poles.
5. Poles loaded on trailers shall be securely bound together and also to the trailer before towing.
6. Auxiliary safety chains shall be used at all times between truck and trailer being towed.
7. Poles being transported along streets or highways shall be plainly marked at the rear with red flags to warn other traffic. Road Safety and Transport Authority (RSTA) regulations covering movement of loads upon streets and highways shall also be observed as applicable.
8. Poles placed on piles or racks shall be securely blocked to prevent rolling or shifting.
9. When piling poles, extreme caution shall be used to keep the poles under control at all times and orders or signals shall be given by only one man.
10. When setting or removing poles in energized lines, care shall be taken to keep the pole from coming in contact with live conductors. On lines operating at 11kV or less, the conductor may be covered with protective equipment or the top of the pole insulated by pole covers. Men handling the pole from the ground shall exercise care and wear rubber gloves.
11. When raising or lowering poles between the live lines rated above 11kV absolute shutdown of the charged lines are mandatory in order to avoid any mishaps.

3.15 LINE WORK ON POLES

1. Before climbing a pole, it should be examined to make sure that it is safe to climb. Where there is any doubt, it should be securely guyed. Temporary guys should be sufficiently high to clear traffic.
2. While guying a pole, pikes may be used if manned. Un-manned pikes alone shall not be relied upon to support a pole while a man is on it.
3. Before removing or adding wires, cables or guys, additional pole guying or bracing should be used where necessary to take the additional strain.
4. Linemen shall wear safety belts, safety helmet and use safety straps while working on poles.
5. Wire hooks shall not be attached to Linemen's belts or safety straps.
6. Safety straps shall not be placed above the top cross arm when it is near the top of the pole.
7. Cross-arm braces or other pole attachments should not be relied upon to support linemen's weight.
8. All light equipment and tools to be used aloft shall be raised and lowered by means of



handline and canvas bucket or other suitable container. Men on the ground should stay clear of overhead work to prevent being struck by falling objects.

9. Tools and material shall not be thrown from the ground to a lineman working aloft nor shall the lineman throw tools and material from above to the ground. Canvas bags and handlines are to be used.
10. Care should be taken by men working overhead to prevent dropping and falling of tools or material.
11. When working along streets or highways, men shall exercise care to keep handlines from blowing into the line of traffic.
12. When stringing or removing wires across streets and highways, avoid interfering with traffic or causing injury to workmen or pedestrians. Danger signs shall be erected on both sides of the work location and where conditions warrant, flag-men shall be stationed.
13. A lineman working on live wires, should, whenever possible, work from below the wires.
14. When working on or near live circuits on poles, never stand on nor touch grounded circuits such as telephone wires or transformer cases. Such hazards shall be covered by suitable protective equipment.
15. All wires, after being placed on cross-arms or racks, shall be considered alive at full voltage unless they are positively known to be de-energized and grounded.
16. A lineman shall not lean on or crowd through unprotected wires and shall protect himself against the possibility of falling into high voltage circuits. If he must pass through circuits to reach his working position, such circuits shall first be covered with protective equipment.

3.16 WORK ON TRANSFORMERS

1. Before starting any work on a transformer installation, it is important to check carefully of possible back feed, abnormal voltage or other dangerous conditions. Unusual circuit conditions may exist which require special consideration.
2. Hot line clamps (PG clamps/lugs), where used on transformer leads, shall be removed from the line before working on transformers.
3. All cutouts and disconnectors for the distribution transformer wherever applicable shall be opened and closed with hot sticks. Whenever possible, fused cartridges should be installed or removed with hot sticks. Eye protection shall be used.
4. Where transformers are to be left disconnected, the fused cartridge or fuse link of the cutout should be completely removed. Where transformers are to be left out of service for a long period, the primary riser shall be removed from the line to the cutout.
5. Whenever transformers are replaced, the new transformers shall be checked carefully for voltage, polarity and phase rotation before service is restored.
6. Only approved potential transformers, voltage detectors and voltmeters shall be used in phasing-out circuits and transformers and testing for potential.
7. Do not rely on the discharge resistor for positive drain off of the residual charge. Eye protection and rubber gloves shall be worn when terminals are short circuited.



3.17 CAPACITORS

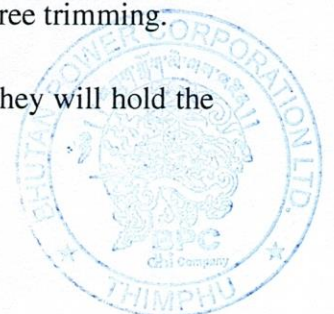
1. The use of capacitors introduces certain hazards which must be thoroughly understood by operating personnel so that adequate protective measures may be taken. A characteristic of capacitors is that they will remain charged at or above full line voltage when disconnected from the source of supply until a discharge path is provided between the terminals. The modern capacitor has a built-in discharge resistor designed to drain off this residual or absorbed charge. The voltage remaining may be eliminated by repeated short circuiting of the terminals until no arc is heard. Each terminal should be short-circuited to ground and grounds left in place while capacitors are considered to be de-energized.
2. Working on capacitors or connected equipment:
 - a. Using the load buster tool, open all cutouts or disconnecting devices to the capacitor.
 - b. Wait five minutes for the internal resistor to reduce the voltage.
 - c. Short-circuit and ground all terminals and case of capacitor.
 - i. Short circuit and ground the capacitors by means of a standard grounding assembly (Hot Sticks and Clamps) or other safely insulated jumper) .
 - ii. In a multiple single phase installation, short circuit and ground one unit. In a polyphase installation, short circuit and ground one unit in each phase.
 - iii. Leave grounds attached while work is being done on capacitor.
 - d. Re-fuse the capacitor units or banks only after a visual inspection for swollen or ruptured units. Swollen units shall be removed and handled with care.
 - e. When a capacitor is in transit or stores, the terminals of the capacitor shall be short circuited and grounded to the capacitor case.

3.18 VOLTAGE REGULATORS

1. When removing a voltage regulator from service, it shall be placed in the neutral position and the control circuit opened before bypassing.

3.19 TREE TRIMMING

1. Power shut down must be taken if tree trimming endangers life.
2. The public should be protected against hazards of tree trimming along public street and highways. Before starting any work in trees, pedestrians and motorists shall be warned by placing danger signs and/or barriers, if necessary, on sidewalks, in the streets and wherever necessary.
3. Before climbing a tree, the trimmer should look it over carefully to decide how to best climb it, the best locations from which to work and the ground area where brush and limbs may be safely dropped.
4. Brush and limbs should not be dropped on streets and highways if avoidable. If not proper Guard should be provided and Limbs and brush removed immediately after tree trimming.
5. Ladders should be used whenever possible for climbing trees.
6. Before climbing trees, the limb should be carefully inspected to make sure they will hold the



trimmer's weight. Dead or decayed limbs are not safe to support any weight.

7. Men working in trees should always use a safety harness, saddle or belt with life-line attached in such a way that if the trimmer loses his footing, he will fall away from electric wires or other hazards.
8. Axes shall not be used aloft; always use saws.
9. Avoid dropping tools from aloft to the ground. All tools should be raised and lowered by handling in such a way as to avoid touching energized conductors.
10. Parts of trees in contact with live wires shall be handled as live wires.
11. Before cutting down a tree, all limbs should be cut off for a sufficient height to avoid striking and damaging property, block and tackle should be used to control the direction of the fall. Felling operation, once started should be finished before the crew leaves for the night, or for the lunch hour.

3.20 RIGHT OF WAY (ROW) CLEARING

1. The Transmission line right-of-way though located mostly in thinly populated areas has hazard to employees while clearing and tree trimming work is being carried out. Such hazards shall be guarded including the following:
 - a. Power shut down must be taken if the ROW clearing endangers life.
 - b. Extreme care should be used in handling axes, brush hooks and other sharp cutting tools.
 - c. Trees shall be carefully felled to prevent their falling on transmission/sub-transmission lines or adjacent buildings.

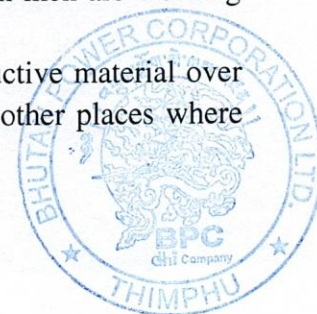
Note: For ROW clearances along various voltage levels of bare conductors refer the BPC Safety Rules 2021.

3.21 PATROLLING LINES

1. Emergency line patrol, trouble shooting on transmission and distribution lines and similar work should always be done with the greatest caution. Patrolling team should avoid walking into fallen wires or metal fences which may be energized by fallen conductors.
2. Should be careful with lighted cigarettes and matches which may cause a fire along transmission or distribution right-of-ways. Break matches and crush cigarette stubs onto earth on discarding.
3. Patrolling team should be alert for stumbling hazards.

3.22 SUBSTATIONS

1. Danger signs shall be placed on all enclosures of high voltage equipment and wherever necessary to warn persons of the presence of high voltage equipment.
2. Gates in station fences and doors to bus compartments and other enclosures containing live equipment, or other hazards shall be kept locked at all times except when men are working inside.
3. When carrying ladders, pipes, conduits, reinforcing rods and other conductive material over 2.0 m in length into stations, switchyards, bus compartment rooms and other places where



there is a danger of touching live parts, the material shall be held by two men, one at each end and carried in the hands and not on the shoulders.

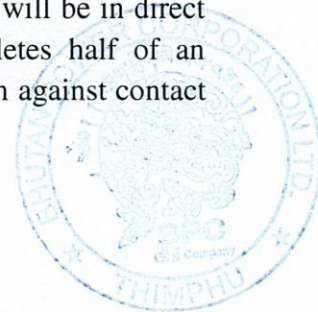
4. Precautions should be taken when working around moveable switch mechanisms as they may be operated without warning and injure someone.
5. Before opening or closing disconnecting switches on any circuit breaker, make sure that the circuit breaker is open.
6. After opening gang-operated air-break or disconnecting switches, check carefully to see that all blades are in the full open position.
7. Low hi-tension leads present a hazard in substations. Barriers shall be erected to guard against this danger.

3.23 UNDERGROUND SYSTEMS

1. Many of the safety precautions that apply to stations and overhead line work should be observed on underground work. Additional hazards, peculiar to underground systems also require special attention.
2. Warning flags etc. by day and reflector lights by night shall be placed at all open manholes, excavations and on tool carts located on public right-of-way or where exposed to traffic of any kind. The warning shall be placed in such a manner as to give persons or vehicles ample time to avoid obstructions.
3. Underground cables rated in excess of 400 volts should not be moved, bent or re-racked while live. Cable route marker must be provided to UG cables as per DDCS.
4. Before any work is started on a cable, in a manhole, the cable shall be checked by the Supervisor/O&M In-charge for location, identifying tag and also by standard clearance procedure to make sure that work is being started on the right cable.
5. Underground Street-lighting circuits shall be considered live and worked as such unless they are positively known to be shut down / de-energized and grounded.
6. Before any cable is worked on, it must be de-energized and conductors of cables properly grounded at both ends.
7. The UG Cables must be laid on the properly designed Cable Trench Rack and the trench must be free of water logging and the burial depth should be 1m for 11 and 33 kV and 0.6m for LV.

3.24 UNDERGROUND RESIDENTIAL DISTRIBUTION (URD)

1. The following rules merely supplement other rules in this manual. Employees must follow all rules that apply when doing this work.
 - a. Underground residential distribution systems have a number of apparent advantages over overhead systems; however, they also have some disadvantages such as confined working spaces, closer clearances between energized parts and greater exposure to all kinds of grounds. In most cases, if protective designs are not used, the employee will be in direct contact with the ground or grounded equipment. This contact completes half of an electrical circuit; therefore, if these contacts are not avoided, or protection against contact not used, serious injury could result.



- b. There is a safe way of doing every job; be sure you know it before proceeding.

2. General:

- a. Location drawings and, where necessary, markers shall be used to identify or locate URD installations.
- b. Before a URD transformer enclosure is open, all unauthorized persons, including private citizens, shall be required to leave the work area and remain clear of all hazards involved in the work.
- c. Short sections of scrap cable provide false indications of the actual position of permanent conductors; therefore, all scrap cable, regardless of length is to be removed from the job site.

3. Opening and Closing circuits:

- a. BPC's switching procedures, including tagging practices, shall be followed when sectionalizing URD system, if any.
- b. When URD circuit has opened, the route of the circuit shall be patrolled for obvious hazards before the circuit is reclosed.
- c. An approved switching tool and rubber gloves shall both be used when switches (including the secondary breakers) in an emergency circuit are opened or closed.

NOTE: *Supervisor may require the use of rubber sleeves in addition to rubber gloves.*

- d. Any URD primary circuit shall be de-energized by opening one or more load- break devices. De-energizing shall be done with a load-break air switch, load- break fuse cutout at the riser pole, load-break tool or other approved load- break devices.
- e. Eye or face protection shall be worn when primary switching operations are performed.

4. Grounding:

NOTE: *A capacitance charge can remain in a URD cable after it has been disconnected from the circuit and a static type arc can occur when grounds are applied to such cables.*

- a. All URD cables and equipment including services that have been energized or could become energized from any source, shall be considered as energized until the equipment is positively proven to be de-energized and has been grounded.
- b. Before doing any work on de-energized primary circuits or equipment:
 - i. A visible open break shall be provided;
 - ii. A voltage test shall be made; and
 - iii. The equipment shall be grounded.



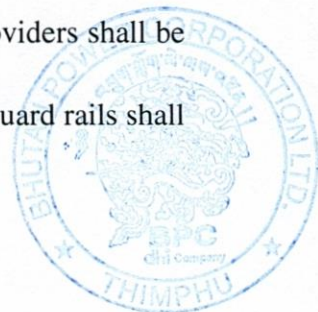
- c. When work is to be done on equipment or cables of an underground system, precautions to prevent back feed shall be taken; this shall include grounding of the secondary conductors where applicable.
- d. De-energized cables to be worked on shall be grounded to a point as close to the work as possible.
- e. All underground cables and equipment carrying current at nominal voltage of 400 volts and above shall be de-energized and grounded before cables are cut into or sliced.

5. Work on Energized Equipment:

- a. When work is performed on cables or equipment carrying less than 400 volts, employees shall take extra precautions in the use of necessary rubber protection, in observing adequate clearances and in using proper tools in order to prevent short circuits.
- b. When energized pad mounted transformers are unlocked and opened, they shall be directly attended by a workman. At all other times, they shall be closed and locked.
- c. A primary or secondary system neutral on any energized circuit shall not be opened under any circumstances.
- d. Plug-in connectors provide a great deal of flexibility in switching and system sectionalizing. However, only those connectors designed and approved for load-break use shall be used to connect or disconnect an energized circuit.
- e. Only tools with insulated handles shall be used for making energized secondary connections, or when work is performed within energized service pedestals, pad mount compartments or submersible transformer enclosures.
- f. Only one energized secondary or service conductor shall be worked on at any one time, and protective devices shall be used to insulate or isolate it from all others.
- g. A shirt or jumper with full length sleeves, rolled down, shall be worn when work is performed on any energized URD cable or equipment.

6. Excavations:

- a. Mechanical excavating equipment shall be used only in areas where there is no known danger of contacting or damaging buried facilities.
- b. Before excavating in any area where buried facilities are suspected such facilities shall be located as accurately as possible.
- c. Whenever excavating is done in close proximity to buried facilities, it shall be done only by hand digging and rubber gloves shall be worn.
- d. If electrical cables are damaged, the following steps shall be taken:
 - i. The area shall be barricaded and the public kept out until hazardous conditions are eliminated.
 - ii. If communication cables are damaged, the communication service providers shall be notified at once.
 - iii. When trenches are left open, warning devices, barriers, barricades or guard rails shall



- be placed to adequately protect the public and employees.
- iv. At the end of each day's work, as much of the trench as practical shall be closed. No more trench shall be open at one time than is necessary.
- v. Rubber gloves shall be worn when using any equipment or tools to excavate, expose or handle secondary cables. They shall also be used when digging with approved hand tools to expose primary cables.
- vi. After completing cable work in a manhole, the cable shall be properly tagged and identified for exact location by a sketch and this information promptly forwarded to the person responsible for keeping such cable identification records if possible for future reference.

7. Distribution Grounding

After obtaining work permit and switching off the system/line, it is important to provide appropriate temporary local earthing at the work site before attempting to carry out any work.

i. Temporary local earthing is essential to:

- a) Discharge residual voltage present in the system/line.
- b) Provide low resistance path for current in case of inadvertent switching of the system, back feeding and induction from adjacent circuit or atmospheric condition.

ii. Temporary local earthing procedure:

- a) The system/line should be switched off and properly disconnected by operating the local isolator switch such as GO/LBS etc.
- b) Use voltage detectors or any other approved method to check and confirm for absence of voltage in the system/line.
- c) Connect the grounding cable (earth lead) of the grounding hot stick to the existing grounding electrode if available at around 5 (five meters) away from the system/line. In absence of such earthing a temporary earthing must be established at approximately 5 meters away by driving an earthing electrode of at least 2.5 meters length and 20 mm dia to sufficient depth.
- d) Once the cable is securely connected to the grounding electrode, all the phases of the system/lines must be discharged one by one with the help of an insulated hot stick and using rubber hand gloves. If the hot stick is not able to reach the system/line from the ground, make suitable arrangement such as climbing half way up the pole observing all safety measures.
- e) When all the phases are discharged, keep the hot stick connected to the Y phase at a distance of about 1.5 meters away from where you intend to work. This connection is very important and must be retained till the completion of the work and removal of the bridging set.
- f) After the above exercise, bridge and bind all the phases and neutral of the system/line together with a separate bridging set of appropriate dia. near a point where the hot stick is connected.



Providing temporary local earthing at both sides of the work location ensures safety from both direction and is very essential to follow this practice.

iii) Temporary local earthing removal procedure:

After completion of work, the temporary local earthing must be removed and following sequence should to be noted.

- a) Remove the bridging set.
- b) From a safe distance, remove the hot stick connection from the line, and finally
- c) Remove the connection from the grounding electrode.

iv) Temporary local earthing precautions

When any part of a distribution system/line is connected to the earth both the system/line and the ground points are brought to the same potential. The potential is dissipated through the ground in gradient form, depending on the effectiveness of the ground media, as such:

- a) The workers/crew should keep clear (at least 2 meters away) of the temporary grounding electrode, particularly when the initial contact is being made with the system/line.
- b) Where ground connection is poor, dangerous voltage difference around the point of temporary grounding electrode can be there and any person standing in this area could be susceptible to severe shock.
- c) When the ground is first applied, all crew members should be clear from the temporary grounding point and stand with their feet together.
- d) The person applying the grounding must wear safety gloves, boots and helmets and should keep a safe distance from system/line conductors.
- e) The grounding once applied should be removed after the work is completed.
- f) Grounding is necessary to be established to minimize hazard.

8. Jumper Removal

Where there is any possibility of hazardous voltage/current being induced to the system or reaching the work site, must remember to remove the jumper from both sides of the work place to ensure safety at work.

Note: The grounding for the distribution lines should be carried out as per the "DISTRIBUTION SYSTEM EARTHING GUIDELINES" First Edition 2018 of BPC.

3.25 OPERATION OF SCADA

The following must be adhered to while operating SCADA:



- a) The SCADA operations shall be carried out strictly as per the Standard Operating Procedures (SOP) outlined in SCADA Operation Manual.
- b) The Feeder on which the SCADA is to be operated must be properly identified to avoid accidents.

CHAPTER - 4: BASIC SAFETY GUIDELINES

These Basic Safety Guidelines set out general instructions concerning procedures and activities associated with work on Electrical Power Systems. It is the duty of all the employees to make themselves thoroughly conversant with the Guidelines and to conduct their work assignments.

The Safety Guidelines shall NOT be breached even in an emergency.

1. No person shall commence work until he/she fully understands the instructions that have been given.
2. Should any person consider that any instruction he has received cannot be carried out safely, then he shall so inform the person who had issued the instruction, he/she in turn shall have the matter further investigated and if necessary, referred to the next higher authority.
3. No person shall interfere with earth connections, locks, Normally Open, Work Permit or danger notices, safety barriers, flags, lamps or other safety devices. These items shall be moved ONLY on the instruction of a person who has authority for the movement of such items.
4. Work shall be confined to the zone, outlined by the Person in Charge of the Work, or as defined by danger notices, screens, rope barriers, or other such means.
5. No person shall take a metal ladder or long object into the vicinity of live equipment nor move or erect a metal ladder or scaffolding therein, unless instructed by the Person in Charge of the work. The Person in Charge of the work must be satisfied that the limits of close proximity are observed.
6. Workers shall operate from a firm footing on secure foundations.
7. Any person who is about to climb above ground shall wear an approved safety belt in the proper manner BEFORE he leaves ground level AND shall apply it in the proper manner when at the work position. On every occasion, before use safety belts shall be subjected to a visual examination by their intended user for any obvious defects.
8. Safety helmets and other items of protection when issued, like gloves, goggles and ear muffs, shall be worn at all times where the work so requires or when instructed to do so by the person In Charge of work.
9. There shall be NO unnecessary conversation or distracting noise, particularly in the vicinity of dangerous equipment that might divert attention from the surrounding danger.
10. ALL BPC staff should be conversant with the treatment for electric shock and also with the approved methods of artificial respiration (CPR).
11. The general safety behavior to eliminate the hazard:



GENERAL

DO	DO NOT
<ol style="list-style-type: none"> 1. Think before you act 2. Ask, if in any doubt 3. Keep gangways clear 4. Keep your bench and work area tidy. 5. Find out the position and type of fire appliances. 6. When using a ladder, make sure it is set on a firm level base AND securely positioned. 7. Report all accidents to your Supervisor. 	<ol style="list-style-type: none"> 1. Do not run 2. Do not play practical jokes 3. Do not touch any equipment or try out machines unless authorized to do so. 4. Do not leave rubbish lying about 5. Do not walk under suspended loads. 6. Do not attempt to give First Aid unless you are trained to do so. 7. Do not carry loads on ladders. 8. Do not throw things.

PERSONAL SAFETY

DO	DO NOT
<ol style="list-style-type: none"> 1. Wear safety equipment 2. Wear overalls/uniforms buttoned up. 3. Overall/uniform sleeves should be worn long and buttoned up. 4. Keep your hair short or wear cap. 5. Keep the workplace clean and tidy. 6. Obey ALL safety rules and signs. 7. Report all accidents, even minor. 8. Properly treat ALL injuries, even minor ones. 9. Wear gloves when handling rough materials. 10. Wear safety helmets when there is danger from falling equipment or when working in a confined space. 	<ol style="list-style-type: none"> 1. Do not wear torn Overalls/uniforms, goggles and protective shoes. 2. Do not wear any loose ornaments or watches when working on machines. 3. Do not take chances. 4. Do not use solvents to remove oil from your hands. 5. Do not roll overall/uniform sleeves above the elbow.

SAFETY TOOLS

DO	DO NOT
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<ol style="list-style-type: none"> 1. Use the correct tool for the job 2. Keep tools in boxes or racks when not in use. 3. Use the correct size spanner to fit the nuts. 4. Tools that are worn or damaged beyond repair should be scrapped. 5. Use a proper toolbox for carrying tools around. 6. When working overhead attach tools to a safety lines 	<ol style="list-style-type: none"> 1. Do not use defective tools. 2. Do not use a file without a handle. 3. Do not use chisels or punches with mushroom heads 4. Do not use a hammer with a loose head 5. Do not carry tools that have sharp points in your pocket. 6. Do not use screw drivers on a work piece i.e. held in the hand.
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MACHINE SAFETY

DO	DO NOT
<ol style="list-style-type: none"> 1. Make sure you know how to STOP a machine, before you to start it. 2. Ensure ALL machine guards are in place. 3. Keep the machine clean and in good condition. 4. If anything goes wrong, switch off the machine immediately. 5. Isolate the machine before making any adjustments. 	<ol style="list-style-type: none"> 1. Do not attempt to operate a machine until you know how to operate it correctly. 2. Do not touch moving parts. 3. Do not move cuttings or drillings with your fingers.

SAFETY-POWER

DO	DO NOT
<ol style="list-style-type: none"> 1. Report ALL electrical faults like damaged cables, sockets and plugs. 2. Keep loose cables off the floor. 3. Keep ALL electrical equipment dry and clean. 4. Use compressed air with care. 5. Wear goggles when using Compressed air. 	<ol style="list-style-type: none"> 1. Do not use defective electrical equipment, cables and plugs. 2. Do not use bare wires. 3. Do not connect power tools to lamp sockets. 4. Do not attempt to repair electrical equipment unless you are trained to do so. 5. Do not direct Compressed air at yourself or your colleagues - IT CAN KILL

SAFETY -LIFTING

DO	DO NOT
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- | | |
|---|--|
| <ol style="list-style-type: none"> 1. Use the right tools and tackles for the job. 2. Lift correctly, using leg muscles and keeping the back straight 3. Check the safe working load marked on the lifting tackle. 4. Examine lifting tackle to ensure it is in good working condition and not worn or damage. 5. Ensure the lifting tackle is correctly fitted before lifting. 6. Protect slings when lifting objects that have burrs or sharp edges. 7. STAND CLEAR when lifting equipment by crane or hoist. 8. Wear safety boots when handling heavy objects. | <ol style="list-style-type: none"> 1. Do not attempt to lift heavy loads manually. 2. Do not leave lifting tackle lying about the work area. |
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4.1 STANDARD PROTECTION CODE

4.1.1 WORK PERMIT SYSTEM

4.1.1.1 GENERAL

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

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

Work Permit system must be followed as per the Safety Code 2008 of the BEA and BPC Safety Rules 2021. A Person may not commence any work (other than routine work, covered by Standing Instruction), unless the work permit has been issued by the O&M In-Charge or his authorized supervisor (for Distribution) and In-charge of the line/substation for Transmission.

Work in a Station may be issued ONLY by persons authorized, as part of their normal duties, to issue work permit in the Station; or by such persons as may, from time to time, be specifically directed or permitted by the In-charge of the Station, to issue work permit.

Each job of work must be issued by ONE person only. Once issued, NO person, other than the Person who issued the work permit, or a person acting on his behalf or with his consent, may interfere with the work permit, or issue any instruction concerning it.

There is ONE exception: *where it may be necessary to stop the work, in order to prevent DANGER.*



Before issuing work permit, the issuer must positively consider what precautions are necessary to ensure the Safety of the men to whom he issues the work permit.

4.1.1.2 TYPES OF PERMIT & ITS APPLICABILITY

- a) **Work Permit:** is a written form authorizing a person to undertake a specific work in a designated area for a specific duration.
- b) **Test Permit:** is a written form authorizing a person to undertake specific testing in a designated area on particular line/equipment for a specific duration. 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.

If the assigned job is not completed within the specified duration, the duration may be extended after obtaining approval from the authorities concerned.

4.1.1.3 WORK PERMIT APPLICATION

a) 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.

b) Except in case of extreme emergency all Work Permit request must be submitted to the Operator in person. The extreme emergency may include the following:

Fire outbreak, natural disaster, imminent loss of life and damage to properties.

c) The appropriate notice must be given to customers for scheduled interruptions.

4.1.1.4 PERSONNEL QUALIFIED TO MAKE USE OF WORK PERMITS

- a) The BPC Managers, Engineers, Supervisors, O&M Focal Person and others in charge of and/or responsible for employees shall ascertain that each employee has received the necessary training or familiar to work or deal with the Standard Protection Code (SPC) and prevailing Standard Operating Procedures (SOP).
- b) The Safety & Quality Division, BPC shall be responsible in monitoring the implementation of work permit in confirmation to SOP and SPC.

Note: For Official Issuing Permit, Taking Permit, Returning Permit and Safety Focal Person/Safety Observer the definitions provided under clause 4.1.1.15 and 4.1.2 may be referred to.

4.1.1.5 PREPARATIONS NECESSARY PRIOR TO MAKING WORK PERMITS EFFECTIVE



If the Operating Station on receipt of the request is satisfied that the request is in order the following will be carried out:

The Operating Station will prepare two switching plans, one for the removal of the apparatus from service and providing protection, and the second for returning the apparatus to normal conditions and record this information in the logbook.

NOTE: If any of the switching checks proves unsatisfactory, further negotiations must be carried on until all parties concerned are in complete agreement.

4.1.1.6 MAKING THE WORK PERMIT EFFECTIVE

The Operating Station will:

- a) Ascertain that all operators are in position as requested.
- b) The Operating Station shall obtain Switching Code No. from BPSO and provide only to the Official Taking the Permit and keep it as secret.
- c) Carry out the switching plan isolating and where possible, de-energizing the apparatus covered by the request made.
- d) Ensure completeness and correctness of the information for both Verbal and Written Work Permit.
- e) Ascertain that all protection devices are tagged and tags placed in position.
- f) Formally issue the Work Permit.

4.1.1.7 METHODS FOR OBTAINING WORK PERMIT

1. 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.

2. Verbal Work Permit: A Verbal Work Permit is to be used in connection with work on transmission/distribution lines and equipment when there is an emergency and where it is impossible for a Written Work Permit to be obtained due to reach. A verbal guarantee of protection is given to the applicant.

a) Request for Verbal Work Permit

Verbal Work Permit shall be requested to the Operating Station. The person requesting for a Verbal Work Permit will provide complete information regarding the following:

- (i) His identity
- (ii) Description and location of the equipment on which work is to be done
- (iii) Protection required
- (iv) Work to be done.
- (v) The authority for doing the work
- (vi) The time and date at which it is desired to commence work and when the work is expected to be finished
- (vii) Interruption to customers, if any

b) Dealing with Verbal Work Permits



The Operating Station in dealing with Verbal Work Permits will consider:

- (i) Interruption to customers, if any
- (ii) The correctness and completeness of the information provided.
- (iii) The effect on service of an outage of the equipment to be isolated.
- (iv) The points for isolating and de-energizing

NOTE: If the applicant believes that the Operating Station has refused to grant a Work Permit which should have been granted he may appeal to his immediate supervisor. When there is any uncertainty as to whether or not a Work Permit should be granted the Operating Station would do well to consult a higher authority.

c) Surrendering of a Verbal Work Permit

The holder of a Work Permit shall surrender it as soon as possible after the need for it is over. Before surrendering a Work Permit the permit holder shall inspect the apparatus covered by the Work Permit and instruct every member of his crew and any supervisor /work In-charge working under his protection that:

- (i) He is going to surrender his work permit
- (ii) Every man must get clear and stay clear of the apparatus.
- (iii) Their protection for work is ended and the apparatus covered by the Work Permit is to be treated as alive.
- (iv) Remove all grounds that were placed on the apparatus by himself for his own protection. (Not including those placed under instruction from the Operating Station).
- (v) The permit holder shall leave the apparatus in the same operating position in which he received it or shall inform the Operating Station of the change made and the reason for these changes.
- (vi) Formally surrender the Work Permit.
- (vii) Give the Operating Station a statement covering the work done.

4.1.1.8 ISSUE AND TAKING OF WORK PERMIT

4.1.1.8.1 Roles and Responsibilities of the Officials

a) It is the responsibility of the Official Issuing Permit to:

- (i) 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 safety measures.
- (ii) 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.
- (iii) Fill up the work permit form even if the work permit is issued verbally.
- (iv) 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.
- (v) Make necessary arrangement with the Permit Holder for providing means of communication at all times.
- (vi) Ensure completeness and correctness of the information for both Verbal and Written Work

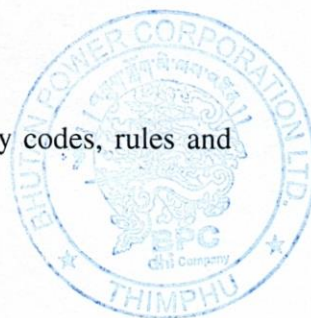


Permits.

- (vii) Authorize the work permit by signing on it with name/personnel number, contact number and designation.
- (viii) Ensure that the area and equipment are made safe before commencement of work
- (ix) Ensure that there are no conflicting activities in the same location.
- (x) Clearly mention the name of the line/equipment for which the work permit is issued.
- (xi) 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.
- (xii) 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.
- (xiii) Ensure that the details of the work permit issued are entered in the work permit register.
- (xiv) Ensure that all work permits are issued in accordance with this procedure.

a) It is the responsibility of the Official Taking Permit to:

- (i) 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 time 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.
- (ii) Obtain the Code Word from the Official Issuing Permit and keep it a secret. He shall not divulge the code word to anyone.
- (iii) Constantly maintain a means of communication with the Operator while the work is in progress.
- (iv) Ensure that the work is performed only on the job for which the Work Permit has been obtained.
- (v) Ensure safety of all persons working under his protection and for all other persons who might directly or indirectly be exposed to danger.
- (vi) Be present in the work area covered by the Work Permit except in the 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.
- (vii) If the emergency is such that the permit holder will not be able to return to the work area, then a completely new Work Permit shall be issued under the direction from the Operating Station and the Work Permit will be completely transferred to the next qualified assistant.
- (viii) Identify hazards and have necessary controls in place.
- (ix) Brief the personnel working under him about the hazards of the job and ways to mitigate them.
- (x) Perform safety drills and Tool Box Meeting (TBM).
- (xi) Make the work area safe and cordon off if necessary.
- (xii) Carry out work in a safe manner and in accordance with relevant safety codes, rules and



regulations.

- (xiii) Maintain records of the personnel working under him along with the details of work done.
- (xiv) Ensure proper completion of work at site; and
- (xv) Remove all tools and equipment from the work site after completion of work.

(c) It is the responsibility of the Official Returning Permit (Permit Holder) to:

- (i) Return the Work Permit to the station personally for cancellation. The **Permit Holder** should actually be the **Official Returning Permit**. However, if he is unable to visit the station personally to cancel the work permit due to some unavoidable circumstances, such information and permission must be sought through SMS (Message) from the Permit Issuer (Official Cancelling Permit) and **must visit the station personally within a week** and take the original copy of the cancelled permit.
- (ii) Inform the code word to the Official Cancelling Permit through telephone followed by SMS clearly mentioning name, personnel number and code word; and
- (iii) Before the leaving the work scene he should 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 recharging the circuit breakers.

(d) It is the responsibility of the Official Cancelling Permit (Permit Issuer) to:

- (i) Check and ensure that the Work Permit is returned by the Permit Holder (Official Taking Permit) only and no other person except in emergencies with prior information provided to the Official Cancelling Permit or the Permit Issuer.
- (ii) Cancel the permit by signing on the form after recording the date and time of return of the Work Permit.
- (iii) Match the code word issued by Official Issuing Permit and the code word given by the Official Returning Permit.
- (iv) Ensure appropriate persons are informed when a job is completed and the permit is cancelled.
- (v) Remove all tags and signs and restore the system after obtaining the required clearances; and
- (vi) Update the Work Permit Register.

4.1.1.9 ISSUING AND TAKING OF TEST PERMIT

Test charging may be required to test and examine the healthiness of a newly constructed line/system or repaired equipment prior to actual commissioning/recharging.

*For Test Permit the same form as provided in **Annexure-I** shall be used. Also all the procedures as required under clause 4.1 above shall be followed for issue, taking, returning and cancellation of the Test Permit.*

4.1.1.10 TRANSFER OF WORK PERMIT (both Work/Test Permits)

- (a) Work permits shall not be transferred from one person to another when the work is in progress or when the work has been completed.



- (b) During exceptional circumstances when the permit holder has to leave work site immediately to attend some unavoidable emergency, the permit secured by him may be transferred with proper written authorization (through SMS) to the next capable person in the team who is fully aware of the ongoing work at site and the all risks associated with it. In order not to compromise on safety, such transfers should be acceptable to the O&M /Substation In-charge/Operator who issued the permit to avoid any confusion or accident.

In case the second person is not accepting to take the risk a totally NEW PERMIT has to be issued by the Permit Issuer to a competent person.

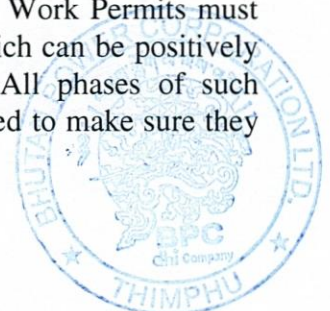
4.1.1.11 GENERAL RULES PERTAINING TO WORK PERMIT

- a) For the approval of operating any elements of power system, due process as per Grid Code Regulations, the BPSO procedures must 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 violation 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 be 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.

4.1.1.12 ISOLATING APPARATUS FOR WORK PERMITS

ISOLATED IS PHYSICALLY DISCONNECTED OR SEPARATED FROM SOURCES OF DYNAMIC ENERGY BY MEANS OF APPROVED ISOLATING DEVICES.

1. For Work Permits, isolation must be complete; that is, the apparatus isolated shall be physically separated from every source of dynamic energy supply.
2. For isolation of electrical apparatus the undernoted shall apply:
 - a. Switches that are used in isolating apparatus for Work Permits must have contacts that are visible, the position of which can be positively determined by an inspection of the contacts. All phases of such switches irrespective of the type must be inspected to make sure they are all open.



- b. If electrically operated or remote mechanically operated switches are used, they shall be locked or blocked open or a portion of the mechanism must be removed and tags hung so as to prevent accidental closure.
 - c. Draw out types of metal clad circuit breakers provides satisfactory isolation when removed and should be locked and tagged.
 - d. Disconnected jumpers and/or bus bars may be used for isolation.
 - e. Equipment such as circuit breakers, concealed blade disconnects, etc., which do not provide a clearly visible air gap must not be employed as a means of isolation for work permits.
3. No change whatsoever shall be made in the guaranteed position of any isolating or de-energizing device which is used to isolate or de-energizing apparatus for a Work Permit, during the period the Work Permit is in effect.
 4. No isolating or de-energizing device, which is specified under a Work Permit as part of the apparatus on which work is authorized, shall be operated to isolate or de-energize apparatus for another Work Permit.
 5. When facilities are available, isolating devices shall be locked or blocked against operation.

4.1.1.13 NEIGHBOURING LIVE APPARATUS

1. Where possible, dangers from neighboring live apparatus will be eliminated by isolating and de-energizing such apparatus and included under the apparatus covered by the Work Permit.
2. Dangers from neighboring live apparatus which cannot be eliminated by isolating and de-energizing and which is known to the Operating Station will be fully revealed to the applicant.

Such dangers can be effectively guarded against by the use of the following methods:

- a. The placement of suitable barriers to prevent accidental contact of workmen with the live apparatus either directly or through tools, material, tackle, etc.
 - b. The placement of suitable warning tape to clearly indicate the safe working area.
 - c. The stationing of a man to watch the workmen and to warn them of dangerous approach to live apparatus.
3. The operating position of any switching device within the protection zone of a Work permit shall not be changed without the permit Holder's consent.

NOTE: All such barriers or tapes are to be removed by the work permit holder at the completion of the work and prior to the surrender of the work permit.



4.1.1.14 RETURNING APPARATUS TO OPERATING CONDITION

1. On the surrender of a Work Permit the Operating Station will: carry out the return switching plan making absolutely sure that all tags concerned are removed.

4.1.1.15 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 the substation In-charge only. For DCSD, he shall be the O&M In charge/Service Centre In-charge.

Applicant: one who is applying for a protection guarantee.

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 shared with any other person except to the official cancelling permit if required.

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

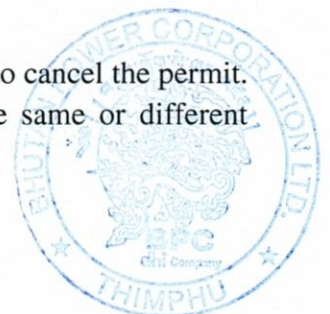
Line/Equipment: a transmission/distribution line or electrical equipment for which the permit to work is being obtained. Mention the GPS number, tower number etc.

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 the 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 the Permit and the Official Issuing Permit can be same or different



depending on the duration of the permit or during unforeseen circumstances.

Qualified Assistance: 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 or the person issuing the permit 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 of the work.

Station: the location from where the Official Issuing permit carries out his duties e.g. substation control room, office of substation/division, shift In-charge etc.

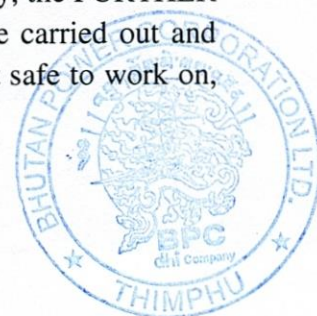
Signing time: The time when the permit holder personally signs on the work permit form within the designated period after the completion of the work.

4.1.2. SAFETY FOCAL PERSON/SAFETY OBSERVER

Besides the official issuing the permit and taking the work permit a dedicated and **eligible Safety Focal Person/Safety Observer** must be appointed for that particular work and particular time/duration. The official issuing and taking the work permit cannot be a Safety Focal Person/Safety Observer and vice versa. All works shall be carried out in presence of the respective Safety Observer. It is the responsibility of the concerned Manager/Supervisor to identify a suitable safety observer amongst the working team. A safety observer shall be responsible for overall safety aspects including matters relating to the work permit regulations within his/her area of responsibility.

The Safety Focal Person/Observer shall be responsible for taking all precautions necessary for the safety of himself and the men in his charge. Before starting work, he shall instruct his men in their PRECISE duties, and shall point out to them the Equipment on which they are to work, AND the Equipment (if any) which they must avoid. He shall satisfy himself that the Regulations contained in these Safety Rules are being observed and that the Work is being carried out in a safe manner. He must be able to give enough time to the job to ensure that his instructions are being carried out and shall thus be responsible for the actions of each man in his charge. In any case of doubt he shall NOT proceed with the work, but shall refer the matter to a senior authority. He MUST ensure:-

- a. That before work is started on any equipment for which isolation is obligatory, this isolation is carried out, AND in accordance with the Standard Operating Procedures.
- b. That before work is started on any equipment for which isolation is obligatory, the FURTHER precautions specified with regard to discharging, earthing, draining, etc. are carried out and that any OTHER precautions he considers necessary to make the equipment safe to work on,



are taken.

- c. That screens or barriers as specified, or as he considers necessary, are erected, to prevent persons engaged in the work approaching: live or dangerous equipment, or other hazards adjacent to the work, or its approaches. He must ensure that attention is drawn to any such hazards which cannot be screened off in this way.
- d. That where, for the purpose of work, temporary openings are made in floors or handrails, these openings are fenced off to prevent the approach of persons who are not immediately engaged in the work for which these openings were made.
- e. That safe means of access to the work exists or is provided, and that where necessary, temporary working platforms are provided (or other adequate means to secure persons against falling) at the work location.
- f. That tools or other equipment are not used, which, due to the nature or location of the work, would introduce a hazard.
- g. That tools or equipment are not used, which, due to their defective condition, would introduce a hazard.
- h. That sufficient lighting exists, or is provided, to enable the work to be done safely.
- i. That in the case of work for which special protective equipment is specified, this equipment is provided and used.
- j. That where work is carried out in enclosed or confined spaces, provision is made for adequate ventilation.
- k. That work is done only in the area mentioned in the work permit. Working in any other area shall be done only after obtaining another work permit and going through the whole process again.
- l. That no one breaches the minimum approach distances and other clearances for safety reasons.

4.1.3. PERSON IN CHARGE OF OPERATION (OPERATOR)

Each item of fixed plant which has been put into commission must at any one time be under the control of ONE person, known as the "In-charge (Person in Charge of Operation)"; he shall have full charge of the Plant, and of the persons engaged in the operation of the plant. He shall be responsible for the manner in which the Plant is operated and for the SAFETY of the men and plant under his control.

He shall be responsible for entering into the appropriate daily log book, details of all important events connected with the availability or operation of the plant under his control, including all switching operations on generators, transformers, busbars, and transmission or distribution lines/cables.

All instructions, from whatever source, concerning the operation of the plant **MUST** be issued through this person, and with the sole exception of the case where emergency action may be necessary to prevent danger, **NO** person whatsoever may perform any operation on the plant, or carry out any work on it, without the **PRIOR APPROVAL** or **INSTRUCTION** of the **OPERATOR**.

Before giving permission for work to be carried out on any part of the plant under his control,



the OPERATOR must be fully acquainted with conditions on that part of the plant, and in particular, must know whether the projected work will affect or be affected by, work already in progress, or by the operation of other parts of the plant. He may, at his discretion, withhold permission for the work to start, or he may refer the matter to a senior authority.

If it is necessary to isolate any equipment or part of the plant, for the purpose of work, this isolation be carried out personally by the OPERATOR or his delegate, who ALSO shall be responsible for issuing proof of isolation, in accordance with the specified procedure.

The OPERATOR may at his discretion permit isolation of the equipment to be carried out by the Person in Charge of Work, who will in this case be SOLELY responsible for any such isolation carried out by him. This situation is subject to the general approval of the Engineer-In-Charge of the station, who will decide the TYPE of equipment so exempted, and PROVIDED there is only ONE person in charge of work on the equipment so concerned (or any other equipment covered by the same isolation).

The OPERATOR may himself issue and take charge of work on the plant under his control, and in such a case HE will be solely responsible for the safe discharge of the work.

If the operation of different sections of the plant in a Station is at any one time in charge of different persons, the Engineer in charge of the station shall define for EACH of these persons the limits of their responsibilities, so that for each item of fixed plant, there shall at any one time, be only ONE Person in Charge of Operation.

Where, for any reason, the person in charge of Operation of a section of the plant is not actually present in the Station, AND it is necessary to carry out work on this plant (other than routine work covered by Standing Instruction), the Engineer in charge of the Station shall appoint a competent person, who shall for the purpose of this work carry out the duties of the Person in Charge of Operation, and shall enter in the appropriate daily logbook the description of the works carried out.

The person appointed MUST be competent, and may be:

The person who issues the work permit, or

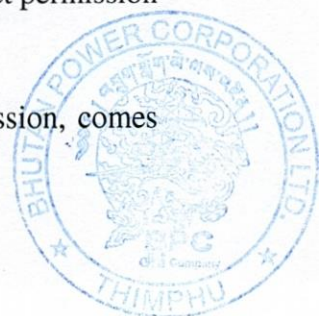
The person in charge of the work, or

The Operator on duty of this section of the plant.

4.1.4 WORK BY PERSONS OTHER THAN STATION STAFF

When work of any description is to be carried out in a Station, by or under the direction of persons who are not Station staff, the permission of the Engineer in charge of the Station (or his representative) MUST be obtained before any such work may commence. When the work is of a recurring nature, this permission must be obtained by the person engaged in or directing the work on the FIRST occasion on which he enters the station for that purpose; thereafter he must get permission if there is a significant change in the nature or extent of the work.

All work on plant or equipment in the Station, which has once been put into commission, comes



under the direct control of the Engineer in charge of the Station, except that, work on newly commissioned plant or equipment will remain under the control of the Organization responsible for its erection until that plant has been formally taken over by the Engineer in Charge of the Station.

a. Work by Contractors

When work is to be done by a contractor, the contractor must appoint a person who will be responsible for the actions of the contractor's employees. The Engineer in charge must nominate a member of the Station staff who will bring the Contractor's representative to the location of the work and will explain to him the nature of the work to be done. He will point out any hazards in the vicinity of the work which the contractor's men must avoid. He will erect such temporary barriers as are specified or as he considers necessary to prevent access to dangerous plant or equipment in the vicinity.

If the work is to be done on plant or equipment which has once been put into commission, the Nominated Person will obtain permission to work from the Person in Charge of Operation. If isolation of the plant or equipment is obligatory, he will ensure that this isolation is carried out in accordance with the specified procedure, and he will personally ensure that such further precautions as "discharging", "earthing" or "draining" etc. when necessary, are carried out.

The contractor's representative will be responsible for transmitting the instructions of the Nominated Person to the men in his charge, and for seeing that these instructions are carried out. The safety of the contractor's employees rest with the contractor.

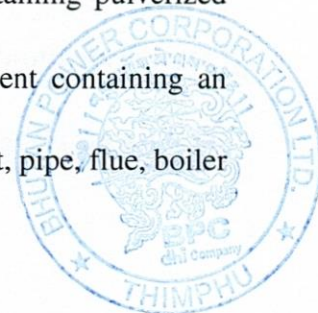
b. Work by persons other than Contractors

When the work is to be done by the BPC staff, other than Station staff, the Engineer in Charge of the station will appoint a Person in Charge of the Work, whose duties with regard to the persons doing the work will be exactly the same as if these persons were on the Station staff, EXCEPT that he will NOT be responsible for the condition of tools or working equipment which have not been supplied by him.

4.1.5 EQUIPMENT CLASSIFIED AS DANGEROUS

Applies to ALL work on fixed Plant which has been put into commission, where the work:

- a. is carried out on or in close proximity to the moving parts of power-driven machinery.
- b. involves the opening up of any vessel, pipe or any other equipment containing compressed air or gas.
- c. Involves the opening up of any vessel, pipe or other equipment containing a corrosive liquid, or any liquid at a temperature greater than 65°C.
- d. involves the opening up of any vessel, pipe or other equipment containing pulverized fuel, or any explosive or poisonous gas.
- e. involves the application of heat to any vessel, pipe or other equipment containing an inflammable substance.
- f. involves entering any Confined space, such as a condenser, tank, culvert, pipe, flue, boiler



drum, boiler furnace, penstock, spiral casing, draught tube etc. which is permanently connected to a source of steam, water, fuel or any other Liquid or gas.

4.1.6 PROCEDURE TO BE OBSERVED WHILE WORKING ON EQUIPMENT CLASSIFIED AS DANGEROUS

1. Isolation before start of work

- a. The person in charge (Permit Holder) of the work must obtain the Work Permit to work from the person in charge of operation (the OPERATOR).
- b. The Work Permit must be signed by the person in charge of Operation signifying that the document gives a complete and accurate description of the operations to be carried out by him or under his direction, and that the isolation provided will not be interfered with in any way until the Work Permit has been surrendered.
- c. The Work Permit must be signed by the person taking the permit (in charge of work), signifying that he is aware of the equipment to which the document refers.
- d. The person in charge of operation, or his delegate, must isolate, or supervise the isolation of the equipment or the part to be worked on.
- e. The person in charge of the work must satisfy himself that the isolation being provided is sufficient to allow him to proceed with the work. If he is not satisfied, he may request and **MUST** be given, additional isolation.
- f. If any of the points of isolation is a drainage point, the person in charge of the work will request drainage before the isolation is completed at that point.
- g. The person in charge of operation, or his delegate, will, after isolation is complete, close the earthing switches on HV electrical equipment which is provided with such switches.
- h. The person in charge of operation shall enter the Work Permit Number and the time and date of issue in the Station log or recorded in the Work Permit register.
- i. The person in charge of work must ensure that all necessary precautions are taken before allowing the work to commence.

2. Procedure when the isolation is to be carried out by the person in charge of the work

In this case the person in charge of the work, whether he himself is the person in charge of Operation or has obtained the required permission from the person in charge of Operation, to carry out the isolation, will be **SOLELY** responsible for:

- a. Isolating the equipment
- b. Placing of Tags, and
- c. Taking any further precautions necessary, before allowing work to commence

This is a Self-Protection Work Permit and a Work Permit is not necessary, **PROVIDED** the same person is in charge of the work from beginning to end of the job. If this is **NOT** so, a Proof of isolation must be made out by the Person in Charge of Operation before any transfer of responsibility takes place.

3. Procedure where more than one person is in charge of work protected by the same isolation.



When an equipment has been isolated for work, only persons under the control of the person for whom the isolation has been provided, may work on the equipment, or any other part protected by that isolation.

When a person in charge of work requires to carry out work on equipment which has already been isolated at the request of another person, the second (and subsequent) persons **MUST** request permission to work and the procedure under item 4.404.1 must be carried out for **EACH** of these persons, in the same way as if he were the only person requesting the isolation. That is to say, the Person in Charge of Operation will:

- a. Issue a separate Work Permit,
- b. Enter this in the log, and
- c. Affix separate Tags, in respect of **EACH** of the Persons in Charge of Work.

4.1.7 PROCEDURE WHICH MUST BE OBSERVED WHEN WORK IS COMPLETED ON EQUIPMENT CLASSIFIED AS DANGEROUS

1. Procedure when Work Permit has been issued

- a. The person in charge of the work must instruct his men to remain clear of the equipment.
- b. He must remove any earths or other obstructions to the operation of the equipment which have been put on by him or under his direction.
He must surrender the Work Permit to the Supervisor/Operator indicating that the work is completed, and that the equipment is in a fit state to be put into operation insofar as he and the men in his charge are concerned.
- c. The person in charge of operation must as soon as practicable, remove the Tags; he must then return the Work Permit to indicate that the isolation is cancelled as far as the work covered by that particular Work Permit is concerned.
- d. When all Work Permits in connection with work on the equipment have been cancelled and all Tags have been removed, the person in charge of operation will as soon as practicable put the equipment into its normal condition of readiness for operation.

2. Transfer of Responsibility (Cancellation of work permit)

The responsibility of the person in charge of Operation for seeing that the correct procedure is observed is automatically transferred to the Person officially taking over duty from this person.

4.1.8 SPECIAL WORK WHICH IS PERMITTED ON UN-ISOLATED EQUIPMENT

1. Moving Parts of Power-Driven Machinery

Work may be carried out on, or in close proximity to the moving parts of power-driven machinery, provided the work is of such a nature that it is not possible to carry out the work with the equipment isolated, AND provided:



- a. that the work is carried out by a competent person, and
- b. that the work can be carried out without any part of the person or his clothing coming in contact with the part being worked on, or any other moving part.

4.1.9 WORK ON HEIGHTS

1. Provision of Safe Means of Access and Safe Place of Work

Before work is started, the person in charge of work must check that the persons engaged in the work can gain access to, and carry out the work without danger of falling.

Where special equipment is necessary for this purpose he must provide this equipment AND see that it is properly used.

a) Means of Access.

Where a person could fall a distance of more than 5 feet in getting to or coming from his place of work, then, if permanent means of access is not provided, temporary means such as ladders, or temporary gangways, or other special means designed for the purpose, must be provided.

2. Safe Place of Work.

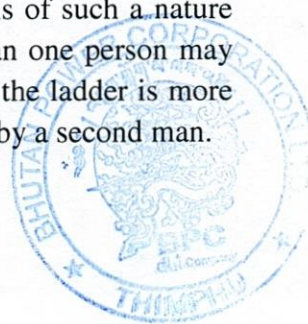
When work has to be carried out from a position from which a person could fall more than 5 feet, unless there is secure foothold, and if necessary secure hand holds, to do the work without danger of falling, required safety means must be provided to the persons engaged in the work. Safety means would include the following:

- i. Fencing
- ii. Temporary working platforms
- iii. Safety belts (affixed to a secure, stable object)
- iv. Safety Helmet

A person must NOT stand on a handrail for the purpose of carrying out work, or for any other purpose.

2. Use of ladders

- a. When a ladder is used as a means of access to a working platform or other landing place, the ladder must rise at least four feet above the point of landing, unless equivalent handholds are provided at that point, and the ladder must be lashed or otherwise secured so that it cannot move at its top point of rest. The vertical distance between landing places must not exceed 25 feet.
- b. A person may only carry out work from a ladder provided the work is of such a nature that one hand is always free to secure a firm handhold. Not more than one person may work from a ladder at the same time. For work other than painting, if the ladder is more than 10 feet long, it must either be held at the top or held at the bottom by a second man.

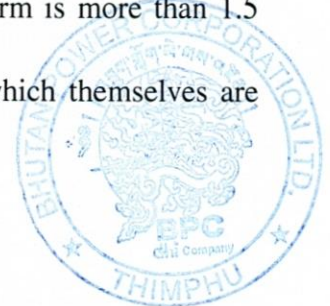


3. Materials for Temporary Working Platforms and Gangways

- a. A person must be appointed to store, issue, examine, and maintain in good condition, ALL materials used in the construction of temporary gangways and working platforms, and no material which is not so set apart shall be used in the construction of such gangways or working platforms.
- b. Every chain or wire rope which is used as a means of support for a working platform or gangway should be included in the six-monthly examination of lifting tackle in use in the station.
- c. Timber planks used in the construction of a gangway or working platform must not be less than 25 cm wide and 4 cm thick.
- d. A working platform or gangway must NOT be supported by means of ladders or fiber ropes, or by means of packing cases or barrels or such like.

4. Construction of Temporary Working Platforms

- a. The following requirements must be complied with in the construction of temporary working platforms:
 - i. In the case of work involving the construction, demolition, maintenance, or decoration of a building, the width of the platform must be at least 65cm (45 cm in the case of a suspended platforms) and if the platform is at a height of 1.5 meters or more, it must be provided with: Handrails between 75 and 90 cm high, and toe-boards at least 20 cm high.
In the case of other work, the platform must be of similar width, and be similarly guarded insofar as the space available allows, if the work is of a strenuous type which requires the use of both hands, or if the kind of work is such as requires the persons engaged in it to be able to move about freely.
 - ii. Planking must be closely laid and must be secured so that it cannot move sideways. Where a plank projects more than 20 cm beyond its end supports, it must be secured against tipping up.
 - iii. The distance between supports must not exceed 1.5 meters in the case of planks 4 cm thick and 2.5 meters in the case of planks 5 cm thick.
 - iv. Where planks overlap, the center of the overlap must be supported, and the edge of the overlap must be protected to prevent tripping.
- b) A free-standing scaffold or tower which supports a working platform, must be tied or strutted to prevent overturning, if the height of the platform above the base of the scaffold is more than 3 times the length of the shortest side.
- c) A working platform must not be supported on trestles if the platform is more than 1.5 meters above the base of the trestles.
- d) A working platform must not be supported on or from brackets, which themselves are held or supported by means of spikes driven into a wall.



- e) In the construction of a suspended platform, provision must be made to ensure that the means of suspension cannot slip or become detached at their upper or lower points of attachment. Where the platform is suspended from outriggers EACH outrigger must be rigidly secured to a building or other fixed structure at TWO points at least. A platform capable of being raised and lowered must not be used for the first time after its erection until it has been tested at its lowest position with a dead load equal to TWICE the maximum load it is to carry when in use.

5. Construction of Temporary Gangways

Temporary gangways must be at least 45 cm wide, but must otherwise be constructed in accordance with requirements for temporary working platforms.

6. Openings in Floors

Where a handrail is removed, or an opening made in a floor, platform, gangway, passageway, or roadway, barriers must be erected, or equivalent measures taken to block the approach of persons not immediately engaged in the work for which the openings were made, and these barriers must NOT be removed until the openings are made good again.

7. Work on Roofs

- a. Roof ladders or crawling boards, or a working platform at least 45 cm wide with handrails and toe-boards, must be provided and used where a person has to work from the outer sloping surface of a roof which has no upright kerb at the eaves. When carrying out preparatory work from such a position, such as inspection of the roof or the fixing of ladders or platforms, a person who decides to use it MUST be provided with a Safety Belt, attached to a rope, which is either tied firmly to a secure fixture, or held by another person.
- b. Roof Ladders or Crawling Boards must be provided and used where persons have to work from roofs covered with Asbestos Cement Sheetting or other brittle material and before allowing work to start on or adjacent to such roofs the Person in Charge of the work must warn EACH of the persons engaged in the work of the DANGEROUS nature of the material covering the roof.



CHAPTER – 5: SAFETY AT CONSTRUCTION SITES AND USE OF APPROPRIATE TOOLS/ EQUIPMENT

5.1 DANGER FROM FALLING MATERIAL

1. Throwing Material from Heights

Articles, materials or debris must not be thrown or tipped from a height, unless barriers are erected, or a person stationed at the lower level to warn ALL persons who might be in danger of being struck; in any case long objects, such as scaffolding material, poles, planks, chains, or wire ropes must not be thrown down, but must be carried down or properly lowered.

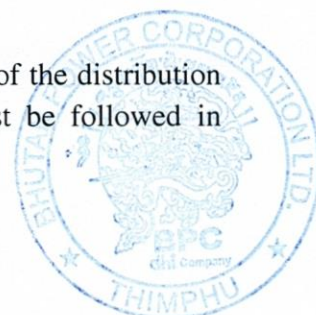
2. Wearing of PPEs.

All persons attending on the hoisting of loose materials who have to work in a position where he could be hit by falling material, must compulsorily wear required safety gadgets provided by BPC.

3. Demolition, Dismantling and Erection of structures

Buildings: Where a building or other large structure is to be demolished (or partly demolished), the person in Charge of work must check, before allowing work to start, that Electricity, Gas, Water, or other services which could give rise to danger, have been cut off. Where flame-cutting equipment is to be used in the demolition, firefighting facilities must be made readily available if all combustible material cannot be removed from the vicinity of the work.

Distribution: While engaged in the demolition and construction activities of the distribution system, all required PPEs must be worn and systematic procedure must be followed in



sequential order. The risk must be analyzed first/Hazard Identification and Risk Assessment (HIRA) must be carried out.

Transmission: The same procedure as followed with regard to demolition, dismantling and erection of distribution structures must be applied.

Note: Before start of the work risk analysis and risk assessment should be made, recorded and awareness created to the employees by the concerned site supervisor. The work place should be made free of all hazards.

4. Excavations

When an Excavation exceeds a depth of 1.0 meters, unless the sides of the excavation are at an angle of less than 45 degrees to the horizontal, the sides MUST be supported at intervals of not more than 2 meters.

The permission of the Engineer in charge of the Station must be obtained before an excavation is made which might affect the stability of walls or other structures in the vicinity of the excavation.

5.2 TOOLS AND WORKING EQUIPMENT

1. Lifting Machines

- a. **Lifting Machine** means: A crane, crab, winch, teagle, pulley block, gin wheel transporter, or runway.
- b. **Lifting Machine Operator:** A Lifting Machine must not be operated, except by a person who is experienced and authorized by the Engineer in Charge of the Station to do such work.
- c. **Operation of Lifting Machines:**
 - i. The Operator of a Lifting Machine must not leave the controls while a load remains suspended over a place to which other persons have access.
 - ii. Where the Operator of a Lifting Machine cannot see the position of a load throughout its travel, a 2nd man must be detailed to give the necessary signals to the Operator.
- d. **Marking of Lifting Machines:** Every Lifting Machine which is used, must have, or be provided with, a means of identification, and every Lifting Machine must have the safe working load clearly marked on it. Every crane with a movable jib must be marked with the safe working load for the LOWEST position of the jib, or, if it is to be used for varying loads at different positions of the jib, it must have attached to it either an automatic indicator, or a chart showing the safe working load for different angles of the jib.
- e. **Testing and Examination of Lifting Machines:**
 - c) A certificate of Test and Examination, specifying the safe working load must be obtained from the supplier, or from a competent authority, in respect of each and every Lifting



Machine in use, and must be kept available for inspection.

- d) Every Lifting Machine be thoroughly examined periodically.
- e) A Lifting Machine which is defective in any way must NOT be used until it is repaired, and if the repairs are substantial, a certificate as in (i) above must be obtained in respect of the repaired machine.

2. Lifting Tackle

a. Lifting Tackle means: chains, ropes (wire or fiber), rings, eyebolts, hooks, shackles and swivels used for lifting or as a means of suspension and not forming a permanent part of a lifting machine or a load.

b. Marking of lifting Tackle:

- i. Every item of Lifting Tackle in use must have marked on it, or on a metal tag attached to it, a means of identification and the safe working load. In the case of a chain or rope the safe working load, so marked, means a safe load which can be carried on a single vertical length of the chain or rope.
- ii. There must be displayed in a position, where it can be readily consulted by users of lifting tackle, a chart showing in respect of the safe load marked on chains, ropes or eyebolts, the safe load which can be carried when the chain or rope is at various angles to the vertical.

c. Testing and Examination of lifting Tackle:

- i. A certificate of test and examination, specifying the safe working load, must be obtained from the supplier or from a competent authority, in respect of ALL items of Lifting Tackle in use (except a fiber rope or a fiber sling), and must be kept available for inspection.
- ii. Every item of Lifting Tackle in use (including fiber ropes and fiber rope slings) be thoroughly examined periodically.
- iii. Lifting Tackle, which as a result of this examination is found to be defective, MUST be withdrawn from use until the defects are made good, or alternatively until the safe working load marked on it has been suitably reduced. A certificate of test as in (i) above must be obtained in respect of any item of lifting tackle, other than a rope, which has been altered or repaired.
- iv. Every item of Lifting Tackle in regular use which is made from wrought iron may be annealed once in every 14 months (6 months if made from a ½ inch bar or smaller) and a certificate of such annealing be kept available for inspection.

d. Use of lifting tackle:

- i. A rope or chain must not be loaded while there is a knot or kink in it.
- ii. A chain must not be shortened or joined to another chain by means of bolts and



- nuts.
- iii. Suitable packing pieces must be used to prevent damage to ropes or chains due to coming into contact with the edges of loads of hard material.
- iv. Rings, links, shackles or eyes must be large enough to ride freely on any hook to which they are applied in order to avoid overstressing the hook or the fittings.
- v. Where avoidable, an eyebolt should not be loaded at an angle greater than 30° to the threaded shank. When an eyebolt is used for inclined loading, the eyebolt must be constructed with a collar which bears squarely against the load surface, and the lift must be applied in the plane of the eye. Shims or washers used to align the eye for this purpose should be the minimum thickness necessary for the purpose.

3. Portable ladders

- a. A ladder must not be used which has a missing or defective rung, or a rung which depends for its support SOLELY on nails or screws.
- b. Paint must not be used as a preservative on timber ladders; a timber preservative which will not conceal defects may be used.
- c. Portable timber ladders must not be left permanently out of doors, or be used as a permanent means of access to positions out of doors.

4. Portable Electric Tools

- a. Every portable electric tool must be stored in a dry, clean area to which ONLY authorized persons have access.
- b. Each time a portable electric tool is issued the user should check that it has been deemed safe for use. The name of the person to whom it has been issued and the date should be entered in a register.
- c. Every portable electric tool in use be examined and tested once every year as follows:
 - i. Check visually that the flexible lead, plug and terminal cover are free from obvious defect and that the connection at the Plug AND appliance are sound.
 - ii. By means of a suitable test kit, pass a steady current (not less than 10 amps) between the plug earth terminal and the frame of the appliance; note the value of the current.
 - iii. Check the insulation resistance between the earth terminal and each of the other two terminals of the plug.
- d. A Report of the result of the above examination and test showing the value of the current in the earth wire and the insulation resistance must be entered in the record sheet mentioned in (b) above.
- e. The earth wire continuity of EVERY portable electric tool must be confirmed by means of a low-voltage bell or lamp, immediately before each issue from stores.
- f. Plug for portable electric tools must be of molded rubber or other unbreakable material, unless the plug and outlet are of SPECIALISED construction.

5. Eye Shields



Goggles or eye shields must be provided and used for dry grinding, turning of metal, hard scale chipping or power-driven brushes, electric or gas welding and cleaning by means of compresses air or blower.

6. Grinding Machines

- a. Every grinding machine (fixed or portable) **MUST** be fitted with a guard to protect against possible fracture of the wheel.
- b. A notice must be displayed adjacent to every fixed grinding wheel, warning that goggles must be worn while using the machine and stating where goggles can be obtained.
- c. In the case of portable grinding machines, goggles must be issued from the stores at **EACH** issue of the machine and a notice to this effect must be displayed in a prominent position in the stores.
- d. Every grinding machine (fixed or portable) must have the spindle speed clearly marked on it.
- e. A Grinding Wheel must **NOT** be fitted to a grinding machine unless the **MAXIMUM PERMISSABLE SPEED** is marked on the wheel and a wheel must **NOT** be operated at a speed greater than the maximum permissible speed marked on it.
- f. Every fixed and portable grinding machine in use must bear an identification number or serial number.
- g. A record sheet must be kept showing the identification number or serial number of **EVERY** grinding machine.
- h. Every grinding machine must be examined regularly and the result of the examination entered in the record sheet. The examination must include the following:
 - i. Check that the guards are in position.
 - ii. Check that the spindle speed is clearly marked.
 - iii. Check that the wheel is properly secured and is in sound operating condition.
 - iv. Check (in case of fixed machines) that the work rest is in position, **AND** is properly adjusted i.e. it must **NOT** be more than 3 mm from the wheel.
 - v. Check in the case of air-driven machines, that the **ACTUAL** speed of the spindle is **NOT** higher than that marked on the machine.





Bhutan Power Corporation Limited

Electrical Safety Tips

Take care when using electricity. It has the power to kill!
Low voltage does not mean less danger.
Stay away from electrical equipments!



Never use home-made water immersion heaters; it is dangerous as the coil is not insulated.

Use standard immersion water heater in plastic bucket and unplug the heater after heating the water or when not in use.

People play with power lines by throwing stones at the insulators.

If the insulator breaks, leakage current will pass through the steel pole; it will endanger living beings and disrupt the power system.

Do not throw stones and break the insulators.



Be careful if you see this **DANGER** sign.

Do not go near or enter inside when you see such danger sign.



In case of electric fire or flickering light or sparking on wall socket or on distribution board, turn off the main switch and call a qualified electrician to see to it.

Do not use water to extinguish electric fire before switching off the power supply.

Planting of trees near or under electrical line are dangerous especially tall growing trees as branches could touch the live wires.

Never plant trees or bamboos near or under power lines.



In case of Emergency, contact: TOLL FREE Number: 1250

CHAPTER-6: METERS AND ASSOCIATED WORKS

6.1 GENERAL INSTRUCTIONS

Meter readers engaged in Meter related work should guard against such hazards on customer premises as slippery walks, broken steps, loose materials on stairways, low hanging pipes, cross dogs and the likes.

6.2 TIDINESS

All scrap wire, seals and other waste material should be removed from the customer's premises.



6.3 INSTALLING METERS

Socket meters are not to be forced into position by being struck by the palm of the hand, leather gloves should be worn when installing or removing meters to protect against cuts from glass breakage, sharp sealing rings etc.


6.4 PRIMARY METERING

Work on primary metering shall be done by qualified employees only and in accordance with all Safety instructions pertaining to clearance and grounding which apply and the use of protective equipment as outlined elsewhere in this manual.

6.5 CURRENT AND POTENTIAL TRANSFORMERS


1. The metal cases of all instrument transformers shall be grounded.
2. Current transformer secondary shall never be opened when current is flowing in the primary or when line is energized.
3. Avoid short circuiting the secondary circuits of potential transformers.
4. The secondary circuit of current transformers shall be connected to ground at all times while the transformer is in service (Testing procedures may alter this requirement).
5. The low voltage winding of potential transformers shall always have one side permanently and effectively grounded. (Testing Procedures may alter this requirement).
6. The following precautions shall be observed when inserting or removing HV potential transformer fuses:
 - a. Rubber gloves with leather protectors must be worn at all times when inserting or removing fuses.
 - b. Fuses shall only be inserted or removed by the use of switch-sticks or fuse tongs of proper design and length.
 - c. A blown fuse must not be replaced until a visual inspection of transformer has been made to determine the cause. If the inspection indicates no reason for the failure then it is in order to insert another fuse.
 - d. When replacing a blown fuse, do so in a positive manner, never withdraw once proceeding to insert another fuse.
 - e. Fuses must never be inserted or removed by hand unless the circuit has first been isolated effectively, that is, disconnected from the circuit and grounded.
7. Recommended safe minimum working distance for inserting or removing voltage fuses for various phase to phase voltage levels are as follows:
 - a. 33kV and below minimum 2.7 m
 - b. Above 33kV minimum 4.0 m





Bhutan Power Corporation Limited

ELECTRICAL SAFETY TIPS



Electricity has the power to light lamps that help us see at night and fuel heaters that keep us warm in winters, but it is important not to get in electricity's way because it can harm you. Here are a few safety tips to remember:

Indoor Safety Measures



Do not use locally made (wooden) immersion water heater rod.

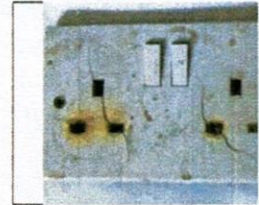


Always use MCB and ELCB and not cut-out fuses.

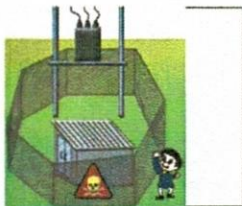


Remember not to overload your power socket.

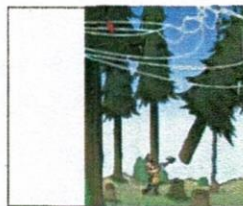
Issued in the Interest of the public



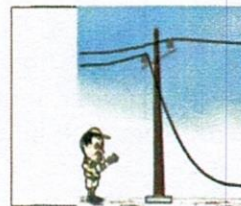
Do not use old and worn-out power socket



Do not play around substations and transformers.



Do not fell trees near power lines/poles/towers.



If you see any fallen electric line immediately call BPC at 1250 (toll free)

Outdoor Safety Measures



Follow the cautionary signs seriously.

CHAPTER - 7: OTHER SAFETY PRECAUTIONS/GUIDELINES

7.1 HOUSEKEEPING -CLEAN, ORDERLY PREMISES

Control rooms, switchboards, relay panels, etc. are to be kept in a clean and orderly fashion. Switchboards are not to be written upon nor are unauthorized tags, calendars, etc. to be attached to them. Lunch boxes and cooking utensils are to be kept in accommodations provided or otherwise out of sight when not in use.

7.2 GENERATING, TERMINAL AND SWITCHING STATIONS



During periods of emergency operations of generating, terminal and switching stations all personnel not directly concerned with the operations taking place should be informed to leave the control room and not return until conditions have been returned to normal. This is essential in order to reduce distractions, and the chances of making operating errors.

7.3 INTOXICATING BEVERAGES

7.3.1 Any employee found on duty in an intoxicated condition shall be immediately told to leave and will be subject to disciplinary action.

7.3.2 Should any employee report for duty in a condition which, in the opinion of the man he is relieving, renders him unfit to perform his required duties safely and efficiently, the man on duty shall remain at his work and shall report the condition of the incoming employee to his superior and ask for instructions.

7.4 EQUIPMENT TO BE TREATED AS ALIVE

All apparatus which is capable of being made alive from any source shall be treated as alive at all times unless covered by a Work permit and de-energized.

7.5 REPORTING WEATHER CONDITIONS

Information with regard to lightening, wind, snow and hail storms or any unusual conditions must be reported immediately to the appropriate operating stations whose work may benefit from such information.

7.6 ORDERS OR MESSAGES

No verbal orders and messages shall be accepted as complete until the identities of the giver and receiver have been made known to each other and the message has been repeated back for confirmation.

7.7 CONTROLS, METERS AND PROTECTIVE EQUIPMENT

No controls, meters, protective equipment or their circuits shall be worked on without the consent of the proper authority responsible.

7.8 CHANGING SHIFTS

Where two or more operators are on duty, they shall as far as possible, keep each other informed as to their whereabouts when outside the control room. When changing shifts, both incoming and outgoing operators shall sign the station daily log. Each operator shall sign in the presence of the other with effective time of shift.

7.9 UNAUTHORIZED PERSONS/VISITORS IN CONTROL ROOMS

The employees on duty shall not let unauthorized persons enter the station. In all cases whether BPC employees or not, visitors must follow the BPC's Safety regulations. It will be his duty to direct such person politely to get the permission from competent BPC authority.

8.2 SWITCHING DEVICES

8.2.1 IDENTIFICATION

All switching devices must bear a clearly visible official designation in the form of a descriptive name or number. This designation must be used in all references to these



devices.

8.2.2 OFFICIAL DESIGNATION

The official designation must be located in a readily visible place, and in such a manner that there will be no doubt regarding the identity of the device.

8.2.3 REMOTE CONTROLLED SWITCHING DEVICES

Electrically remote controlled switching devices must carry designation signs, both at the mechanism and at the control point.

8.2.4 DISCONNECTING SWITCHES

Where many disconnecting switches are installed in a common location, and more or less in the same plane, distinct identification of each set of switches must be clearly indicated.

8.2.5 PROCEDURE FOR RECORDING THE OPERATION OF SWITCHING DEVICES

The switching operations done must be listed in the proper operating sequence with time in the substation log book.

8.2.6 PROCEDURE FOR ISOLATING APPARATUS USING CUT-OUTS AND DISCONNECT SWITCHES

If a cut-out or disconnect switch has a removable cartridge or blade, such cartridge or blade must be completely removed when such device is opened manually, or hot tap removed.

8.2.7 DISCONNECTING SWITCH OR CUTOUT CLOSED IN ERROR

If a disconnecting switch has been closed in error, the switch must be left in the closed position until it is definitely known that no dangerous arc will occur upon opening the switch.

8.2.8 DISCONNECTING SWITCH OR CUT OUT OPENED IN ERROR

If a disconnecting switch or cut-out has been opened in error, it should be left in the open position until instructions are received from the operator in charge. However, if it is obvious that the switch is being opened in error and the arc is not yet broken it should be reclosed immediately.

8.2.9 DEFECTIVE APPARATUS

Any defects in operating apparatus or improper functioning of same must be reported immediately to the operator in charge and Supervisor or his delegate.

8.2.10 CHECKING OPERATING POSITION OF CIRCUIT BREAKERS



The operating position of any circuit breaker in series with a disconnecting switch must be checked in the open position, where practical, before operating the disconnecting switch.

NOTE: Circuit breaker indicating lights may only be used as an indication that a breaker is open if the disconnect switch to be opened is electrically operated from a remote point and interlocked with the breaker or breakers concerned. Other-wise a circuit breaker must be checked open by either the mechanism position, or by its targets located at the breaker.

8.2.11 LOCKING DISCONNECT SWITCHES

The mechanism of disconnecting switches **MUST** be locked.

8.2.12 CLOSING STICK OPERATED DISCONNECT SWITCHES

When closing a stick operated single pole disconnecting switch or cut out the blade should be lined up and then closed deliberately and without hesitation. It should be closed firmly but not slammed.

8.2.13 OPENING STICK OPERATED DISCONNECT SWITCHES

When opening a stick operated single pole disconnecting switch or cutout the blade should be opened to its full travel in one quick movement.

8.2.14 INTERRUPTING LOAD CURRENT ON A DISCONNECTING SWITCH

Do not attempt to interrupt heavy load current on a disconnecting switch or cutout, unless the switch is equipped with special load break equipment, i.e. load break cut-out or portable load buster tools etc.

8.2.15 OPERATION OF INDOOR DISCONNECT SWITCHES

When operating disconnect switches or cutouts indoors, or in a cubicle, operators should see that the doors are left open and clear of obstructions so as to allow free exit in the case of trouble and should not allow themselves or any other party to get in such a position that an electric arc or other trouble would cut off the only means of escape.

8.2.16 SAFETY GADGETS

Rubber gloves with leather protectors, safety helmets and safety glasses must be worn whenever operating stick or gang operated outdoor or indoor disconnecting switches. Safety goggles or other suitable eye protective devices shall be worn when performing any air break switching when the possibility of eye injury could be sustained due to flying particles, fused metal or arcing.

8.2.17 CHECKING DISCONNECT SWITCH AFTER OPERATION

After a disconnect switch has been operated it **MUST** (if possible) be very carefully



checked to ascertain that it is properly opened or closed as the case may be.

8.2.18

OPERATION OF DISCONNECT SWITCH AFTER AN IMPROPER OPERATION

If a disconnect switch has failed to open or close properly, the operator may operate the switch again if he has a thorough understanding of what will take place when the switch is reopened or reclosed as the case may be. However, if there is any doubt concerning the results of a second operation the operator will leave the switch or cutout as it is and report the condition to the higher authority.

Annexure-I

PERMIT TO WORK

☐

TEST

☐

Permit No.:

Date:

Issued to:

You are hereby permitted to work on (mention name of the line/equipment)
.....at.....GPS No.....from.....



..... Hours of to Hours of Your
 permit 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:

EID No.

Designation:

Date/Time:

Contact No.:

Signature of Official Taking Permit

Name:

EID No.

Designation:

Date/Time:

Contact No.:

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

I hereby return the permit No.....with Code No./Code Wordat (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:

EID No.

Designation:

Date/Time:

Contact No.:

Signature of Official Cancelling Permit

Name:

EID No.

Designation:

Date/Time:

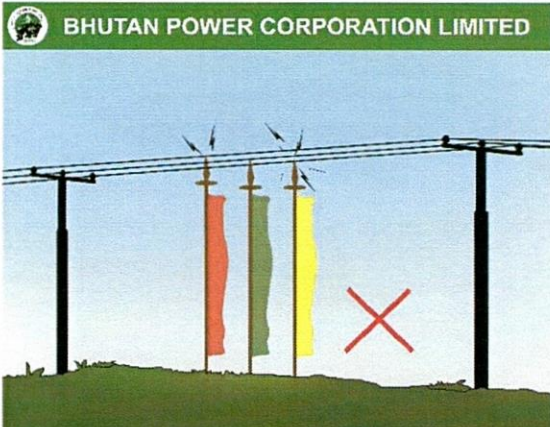
Contact No.:

REVISION HISTORY

Date	Release	Additions/Modification	Approved by
May 2021	First Release	First Edition	BPC Management



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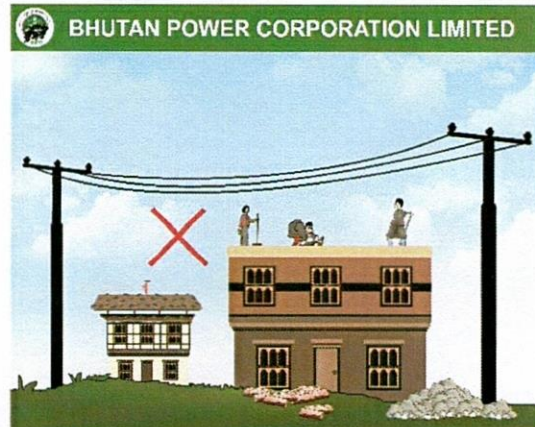


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 Prayer flag below or near power line is not safe.

གྲོག་ཐག་མེ་ལྷག་པ་གི་འོག་ལུ་དང་ གྲོ་འདབས་ལུ་ དར་མིང་འཕྲུ་རྒྱུ་མི་འོང།
 Do not erect prayer flags below or near any electrical lines.

མི་ལུ་ ཡང་ན་ ཀུམ་ཚུ་ འབག་འཕྱོད་ ཡང་ན་ དར་མིང་ ཡང་ན་ དེམ་པོ་མིང་མ་ཚུ་ ལག་ལེན་ཐབ་པའི་
 གྲུབ་མ་ བཅུ་ལ་ལས་ ཡོད་པའི་གྲོག་ཐག་ལུ་ རེག་མ་ བརྟུག་པར་གཞུག་གཞུག་འབད་དེ།
 Watch out for overhead wires and power lines while using ladders or carrying
 pole/flag post or handling long objects

BHUTAN POWER CORPORATION LIMITED



གྲོག་ཐག་གི་ཉེ་འདབས་ལུ་ ཡང་ན་ འོག་ལུ་ གྲོག་ཐག་ཚུ་ བཅོ་བསྐྱར་མ་འབད་ བཅོ་བསྐྱར་
 འབད་བཅིན་ རང་གི་སྤྱོད་དང་སྤྱོད་པོ་ལུ་ ཉེན་ཁ་སྤྱོད་ཡོད།
 Do not construct houses or structures under or near electrical lines
 as it could be extremely dangerous to life and property

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 Houses constructed below the power lines are subjected to lightning
 strikes.

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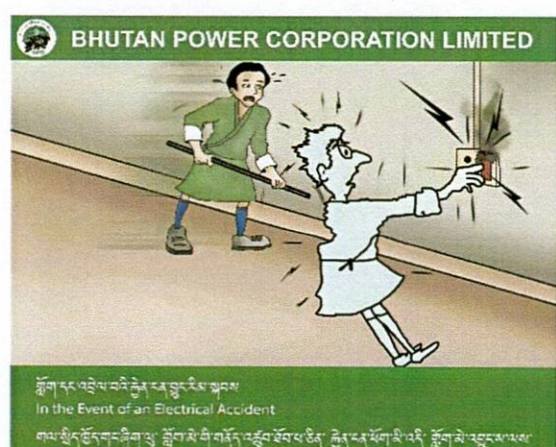


མར་འདྲི་གི་ གྲོག་ཐག་ རྩོམ་ཐོ་བཅོམ་ རྩོམ་ཐོ་འདྲི་ལག་ལེན་འབབ་པའི་སྤྱོད་པོ་ལས་ རྩོམ་ཐོ་ལེན།
 Picture shows using home-made water immersion heaters.

གྲོག་ཐག་ རྩོམ་ཐོ་བཅོམ་ གི་ རྩོམ་ཐོ་ འདྲི་ལག་ལེན་པ་ལྟ་ལེན་པ་ལྟ་ བསྐྱོམ་སྤྱོད་པའི་ གྲོག་ཐག་གི་ བར་
 གྲུབ་མ་ལས་ ཉེན་ཁ་འཕྱོང་མ་ཅན་ཅིག་ཡིན།
 Never use home-made water immersion heaters; It is dangerous as the
 coil is not insulated.

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 Use standard immersion water heater in plastic bucket and unplug the
 heater after heating the water or when not in use

BHUTAN POWER CORPORATION LIMITED



གྲོག་དང་འབྲེལ་བའི་ཉེན་ཁ་ལྟོང་པའི་སྤྱོད་པོ་ལས་
 In the Event of an Electrical Accident

གལ་པ་ལྷིང་ཚུགས་ཀྱི་ལུ་ གྲོག་ཐག་གི་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་
 རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་
 If someone receives an electric shock; use a non-metallic object, such as long
 dry wooden stick, dry rubber/PVC pipe, to separate the victim from the power
 source

གལ་པ་ལྷིང་ཚུགས་ཀྱི་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་
 If it is inside the house, immediately put off the main switch.

ཉེན་སྲོལ་ འབད་པའི་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་
 The rescuer should never touch the victim unless she is fully insulated.

ཉེ་འདབས་ གྲོག་ཐག་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་
 རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་ རྩོམ་ཐོ་
 Call nearest BPC office/staff and the Health Help line 112

