NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
ISLAMIC REPUBLIC OF PAKISTAN

NEPRA
POWER SAFETY CODE 2024

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA

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1. Purpose

1.1. In exercise of the powers, conferred by Section 7(2)(i), and 35(a) read with 14B(4), 14D(2), 18(1), 18B(2)(c), 19d, 21(2)f of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 (XL of 1997) (hereinafter referred to as the "Act") and provisions as prescribed in NEPRA Performance Standards Rules, Grid Code, Distribution Code and Consumer Service Manual, the National Electric Power Regulatory Authority devised this Power Safety Code (the "Code").

1.2. To ensure that the licensee, NEPRA's concurrence holder, generation company, registered person or a network owner with a connection agreement, power purchase agreement, relevant contract or among others, during the conduct of their operations including but not limited to construction, operation, maintenance, turnaround, rehabilitation, standby, decommissioning, mothballing, and demolition are planned and conducted by Generation, Transmission and Distribution companies in an efficient and safe way without compromising on occupational Health, Safety and Environment aspects.

1.3. The Licensee, NEPRA's concurrence holder, generation company, registered person, or a network owner with a connection agreement, power purchase agreement, relevant contract or among others, at the site of construction, operation, maintenance, turnaround, rehabilitation, standby, decommissioning, mothballing, and demolition shall take precautionary measures to;

- Protect the lives and well-being of employees, contract workers and general public including visitors, and animals,
- Eliminate and/or minimize any impact or damage to the environment,
- Eliminate and/or minimize damage to the equipment, property and associated facilities as well as that of neighboring areas near to operations,
- Eliminate and/or minimize economic losses and disruption to business for safe and smooth operations.

For the purpose of maintaining highest standards of HSE at workplace, follow NEPRA Act, Rules and Regulations made thereunder, this Power Safety Code and other applicable documents to be issued in future.

2. Definitions

The terms and expressions used but not defined in this code shall have the meaning assigned to them in the Act.

2.1. **Act**

The term "Act" means the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 (XL of 1997).

2.2. **Annual**

The period of one fiscal year, starting from July 01 and ending on June 30.

2.3. **Arc Flash**

An electrical arc flash is a sudden, intense release of energy due to a fault or short circuit in an electrical system, generates intense heat, light, and pressure waves, posing a significant hazard to personnel and equipment within the vicinity. The arc flash may occur during electrical isolation, operating breakers, switches or starters, racking breakers in or out, testing electrical circuits, and applying temporary earthing, etc.

An arc flash is sometimes inappropriately called a "flashover." Flashover is associated with fires and combustion within enclosed spaces, with a sudden burst of flames from combustible materials that are ignited rapidly and filling the space, often accompanied by a significant increase in temperature.

2.4. **Authority**

The term "Authority" means the National Electric Power Regulatory Authority (NEPRA) established under Section 3 of the NEPRA Act.

2.5. **Building**

A structure with a roof and walls.

2.6. **Calibration**

Calibration is the process of configuring an instrument to provide a result for a sample within an acceptable range.

2.7. **Consumer Premises**

Consumer premises refers to the physical location where a consumer or end-user directly receives and uses electrical services.

2.8. **Contractor**

An independent external organization/company that has been awarded a contract by the company for providing services or carrying out specific activities under the agreed contract specifications, terms and conditions. Sub-contractor is an external contracting organization/company designated by the Contractor to perform parts of the scope of work and with prior written approval by the company.

2.9. **Contractor Employee**

Person employed by a contractor or sub-contractor to perform specific tasks or services for the company as per contract.

2.10. **Competent Person**

A medically and physically fit person who is assigned, designated and authorized in writing to perform a specific type of duty or to be at a specific location, having necessary training, experience, technical skills, as well as relevant qualifications, certifications or licenses to perform assigned roles and responsibilities safely.

2.11. **Distributed Control System (DCS)**

DCS is used in Power Plants, a computerized process control system for operation usually with many control loops, used for system management and data collection.

2.12. **Electrical Worker**

An Electrical Worker received general electrical training, performing routine tasks like basic maintenance, repairs, and installations. They understands basic electrical principles, hazards, and safety practices, and typically possess standard certifications or licenses for general electrical work. They handles common electrical systems in residential, commercial, and light industrial settings. These workers often works under the supervision of experienced or specialized electrical personnel for more complex tasks.

2.13. **Specialized Electrical Worker**

A Specialized Electrical Worker receives advanced or specialized electrical training, enabling them to handle complex and high-risk electrical tasks. They possess in-depth knowledge of advanced electrical concepts and high voltage safety protocols. Holding advanced certifications, specialized licenses or specific training certifications in areas like high voltage systems, hazardous locations, or specialized industrial machinery. They can work independently on complex assignments, and handles specialized electrical systems in high-risk environments.

2.14. **Employee**

A person who performs tasks assigned by the organization/company. Employment can be regular, contractual or daily wages. Examples of employees include:

- Regular Employee.
- Contract Employee.
- Daily Wage Worker.

2.15. **Environment**

Surroundings in which organization operates, including air, water, land, natural resources, flora, fauna, humans and their interrelation.

2.16. **Environmental Impact Assessment**

Environmental Impact Assessment (EIA) is a process of evaluating the likely environmental impacts of a proposed project or development, taking into account inter-related socio-economic, cultural and human-health impacts, both beneficial and adverse.

2.17. **Environmental Aspect**

An element of company activities, products and services that can and/or does interact with the environment. Examples of environmental aspects categories are:

- Air Emissions,
- Energy,
- Soil contamination,
- Water contamination,
- Biodiversity,
- Materials (Procurement, Storage and Use),
- Effluent discharges,
- Solid Waste Generation,
- Sludge Generation,
- Freshwater/Seawater consumption,
- Crude Oil consumption (consumption of nonrenewable resources),
- Noise.

2.18. **Environmental Impact**

Any change to the environment, whether adverse or beneficial, resulting from organization's activities, product and services.

2.19. **Exposure**

Presence of a hazardous substance (Solid, Liquid or Gas), or physical factors (noise, temperature, vibration, non-ionizing, and ionizing radiation) in an area where a person works.

2.20. **Excavation**

Any man-made cavity or depression in the earth's surface, including its sides, walls, or faces, formed by earth removal. This could be carried out manually, by power tools or mechanical excavator.

2.21. **Facilities**

Space or equipment necessary for doing an operation or process.

2.22. **Fire**

Fire is a chemical reaction that occurs when a combustible substance/fuel combines with oxygen in the presence of heat, typically producing smoke, flame, heat, and light. It is a rapid oxidation process that releases energy in the form of heat and light.

2.23. **First Party**

The first party is the primary entity or department involved in an internal audit or inspection of its own system or site. The second party is the entity or other department(s) that interact directly with the first party within an organization to conduct an internal audit or inspection. The third party is an external entity or organization that is not directly involved in the primary interaction between the first and second parties but may conduct audits or inspections.

2.24. **Goal**

A goal is a SMART (Specific, Measurable, Achievable, Relevant, and Time-bound) objective or target that a person or organization aims to achieve within a defined period with management intervention, resource allocation, and support.

2.25. **Guarded**

Moving components or systems are covered, shielded, fenced, enclosed, or otherwise protected by suitable means of casings, barriers, screens, mats, or platforms to mitigate amputation hazards during approach or contact by personnel.

2.26. **Hazard**

A hazard is any source or situation that has the potential to cause harm, injury, damage, or adverse health effects on people, animals, property, the environment, or any combination thereof. Source or situation could be physical, chemical, biological, ergonomic, psychosocial, and environmental hazards.

2.27. **Heavy Equipment**

Any type of heavy equipment or construction machinery used for digging, lifting, moving, and shaping materials such as forklift, excavator, bulldozer, wheel loader, backhoe, grader, crane, dump truck, bucket mounted vehicles and more.

2.28. **HSE**

Occupational Health, Safety and Environment

2.29. **HSE Management System**

The HSE (Health, Safety, and Environment) Management System is a structured framework and documented approach implemented by organizations to manage the health, safety, and environmental risks associated with their activities, providing detailed and clear action steps. It defines the scope, roles, responsibilities, policies, procedures, processes, and practices aimed to promote a safe working environment, prevent incidents and ensure compliance with Power Safety Code requirements. An HSE management system typically covers a range of documents including organization Plans, Policies, Manuals, Guidelines, Procedures, SOPs, General Instructions, Work Instructions, Forms, Checklists, Log Sheets, Data Sheets, Specifications, Reports, Training Material, Handbook, Poster, Alerts, Flyer, Leaflet, and Brochure, among others. It outlines job steps for all end users to perform tasks safely, efficiently, and effectively, describing “who, what, when, where, why, and how” the task should be initiated, conducted, executed, and completed to achieve the desired outcome.

2.30. **HSE Performance**

Health, Safety, and Environmental (HSE) performance refers to an organization's overall effectiveness in managing and achieving its objectives related to HSE culture, protecting the health and safety of its employees, contractors, and the public, as well as minimizing its impact on the environment and preventing asset damages.

2.31. **Immediate Cause and Root Cause**

An immediate cause (also known as a "Causal Factor" or “Direct Cause”) is a human error/ mistake, equipment failure, material failure or natural phenomena that directly leads to the

incident, a specific outcome or consequence. For example, in a workplace accident where an employee slips and falls, the immediate cause may be the wet floor (e.g., due to a spill). However, to prevent future accidents, other root causes should be addressed such as inadequate training, lack of proper signage, or a failure in maintenance processes.

The root cause, often referred to as the "basic cause" or "initial factor" that started the chain of events leading to a problem, issue, incident, or undesired outcome. When root cause is properly fixed, will prevent recurrence or significantly reduce the likelihood of the similar problem or incident in future.

2.32. **In-charge**

The person in-charge who holds a position for control and management of specific equipment, devices, activities, operations and performing, directing or authorizing tasks.

2.33. **Incident**

An incident is an unexpected event that disrupts regular operations and may or may not lead to an accident involving injury, damage, or harm.

Accident

An accident is an unforeseen, unplanned or unexpected event that results in injuries, occupational illnesses, electrocution, arc flashes, spills/releases, fires, explosions, process incidents, property or equipment damage, or environmental impacts.

2.34. **Incident Direct Cost**

Incident Direct Cost refers to cost of direct damage, repairs or replacement, clean-up, material disposal and environmental remediation resulting from the incident.

Direct Cost does not include indirect costs such as operational loss, business opportunity loss, business interruption and feedstock/electricity losses, loss of profits due to equipment outages, cost of obtaining/operating temporary facilities.

2.35. **Inspection**

An examination of a product, process, service, or installation or their design and determination of its conformity with specific requirements or, on the basis of professional judgment, with general requirements at the time of purchase or in-service inspection.

2.36. **Insulated**

Separated from other conducting surfaces by a dielectric (including air space) offering a high resistance to the passage of current.

2.37. **Key Performance Indicator**

A Key Performance Indicator (KPI) is a measurable value that demonstrates how effectively an organization is achieving goals and objectives. Key Performance Indicators (KPIs) are in numbers for the goals and objectives to review and monitor its status for effective implementation.

2.38. **Legal Requirements**

National and provincial laws including the NEPRA Act, rules, regulations, standards, codes, consumer service manual, SOP's, directives, license terms & conditions, agreements, and other applicable documents.

2.39. **Licensee**

The term "Licensee" means a holder of a license under the Act.

2.40. **Likelihood**

Frequency of occurrence of an event/incident.

2.41. **Live Parts (Energized)**

Any electrical conductors, conductive materials or components within an electrical system that are connected and actively carrying an electric current or are electrically charged in normal operating conditions.

2.42. **Machinery**

An apparatus using or applying mechanical power to perform a particular task.

2.43. **Material**

A raw material used in the primary production or manufacturing of goods.

2.44. **Near Miss**

Near miss is an incident which does not result in injury, illness or loss, but which has the potential for injury, or illness or loss. For example, if a worker nearly slips on a wet floor but prevents a fall, it's an incident, near miss or close call, having potential to result in a real accident/injury.

2.45. **NEPRA's Concurrence**

Concurrence refers to the approval granted by NEPRA to power generation companies, indicating that they have met the regulatory requirements to operate. It ensures that the companies comply with NEPRA's standards for safety, efficiency, and regulatory compliance,

allowing them to generate electricity legally.

2.46. **Objective**

Objectives define strategies or implementation steps to attain the identified goals. They are more specific and outline the "who, what, when, where, and how" of reaching the goals.

2.47. **On-job Fatality**

An on-job injury or illness that results in death.

2.48. **On-job Injuries or illnesses**

On-job Injuries or illnesses should be categorized as follows:

2.48.1. **First Aid Injury or illness**

Minor on-job injury or illness requiring one-time treatment, subsequent observation and consultation post-injury during a visit to the medical facility. The treatment, even if administered by a physician, does not require medical or surgical follow-up intervention (Examples: diagnostic procedures such as x-rays and blood tests. Treatments such as tetanus shots, bandaging, using eye patches, hot or cold compression therapy).

A complete list of all treatments considered as First Aid is provided below (Any minor medical treatment which is not in the list should be considered as a Medical Treatment injury or illness)

- Using a non-prescription medication at non-prescription strength level,
- Administering tetanus immunizations,
- Cleaning, flushing or soaking wounds on the surface of the skin,
- Using wound coverings such as bandages, Band-Aids, gauze pads, etc.; or using butterfly bandages or Steri-Strips,
- Using hot or cold therapy or treatments,
- Using any non-rigid means of support, such as elastic bandages, wraps non-rigid back belts, etc.,
- Using temporary immobilization devices while transporting an accident victim (e.g., splints, slings, neck collars, back boards, etc.),
- Drilling of a fingernail or toenail to relieve pressure, or draining fluid from a blister,

- Using eye patches,
- Removing foreign bodies from the eye using irrigation or a cotton swab method only,
- Removing splinters or foreign material from areas {other than the eyes} by irrigation, tweezers, cotton swabs or other simple means,
- Using finger guards,
- Drinking fluids for relief of heat stress,
- Application of antiseptics during the first visit to medical personnel,
- First or second-degree burn(s) that do not require further treatment,
- Application of ointments to abrasions to prevent drying or cracking,
- Application of physiotherapy during the first visit to medical personnel.

2.48.2. **Medical Treatment Injury or illness**

An on-job injury or illness that is more serious than First Aid injury or illness (Examples: Treatment requiring sutures, use of tweezers to remove splinters from eye; rigid means to immobilize part of body). Medical Treatment Case (MTC's) include all cases involving but not limited to:

- Using wound closing devices such as sutures, staples, etc.,
- Using devices with rigid stays or other systems designed to immobilize parts of the body (does not include any non-rigid means of support),
- Removing splinters from the eye with tweezers and other complex means

2.48.3. **Restricted Duty Injury or Illness**

An on-job injury or illness that results in restricted work or job transfer. The employee/contractor cannot perform an activity he regularly performs (Example: A sprained ankle resulting in a re-assignment from field to a desk job). Time period does not include restricted work activity on the day of the injury or illness. Examples of how to determine a restricted work case are:

- Employee/contractor is restricted from performing one or more of the routine functions (work activities which the employee/contractor regularly performs at least once a week) of his/her job, or from working the full workday that he would otherwise have been scheduled to work.

- A medical physician recommends that the employee/contractor cannot perform one or more of the routine functions of his/her job, or not work the full workday that he would otherwise have been scheduled to work.

2.48.4. **Lost Time Injury or Illness**

An on-job injury or illness that involves one or more days away from work beyond the day the injury occurred.

2.49. **Overcurrent**

An overcurrent refers to an electrical current that exceeds the normal rated operating level of an equipment or a conductor, leading to potential damage or hazards. Overcurrent may occur due to overload, short circuit, or ground fault and lightning strikes.

2.50. **Residual Risk**

Residual risk refers to the level of risk that remains after implementing and maintaining existing control measures for risk mitigation.

2.51. **Permissible Exposure Limit (PEL)**

PEL is the occupational exposure standard that refer to the maximum permissible exposure to air-borne substances to which nearly all healthy persons can be exposed to an average 8 hour period per day (Time Weighted Average: TWA) without adverse health effects. Detail information about PEL is primarily found in the Material Safety Data Sheet (MSDS).

2.52. **Periodic Plan**

A periodic plan or schedule that is structured to occur at regular intervals over a defined period of time, such as yearly, bi-annually, quarterly, monthly, or weekly. These plans are designed to help individuals or organizations systematically manage and achieve their goals over time.

2.53. **Power Safety Code**

The NEPRA Power Safety Code is a set of unified and standard HSE guidelines, specifying requirements for an Occupational Health, Safety, and Environment (HSE) management system that licensee, NEPRA's concurrence holder, generation company, registered person, or a network owner with a connection agreement, power purchase agreement, or relevant contract to comply with these requirements.

2.54. **Property Damage Incident**

All safety incidents that result in damage to the company property/structure/equipment however excludes damage to the property/structure/equipment due to fire, or wear and tear.

Property damage incidents may be caused by traffic crashes, cranes related incidents, forklift hitting or damaging an equipment, resulting in direct cost as per criteria set by company.

2.55. **Process**

A series of actions or steps taken to achieve an end result.

2.56. **Product**

The goods or energy produced/generated/manufactured for sale.

2.57. **Registered Person**

The persons registered under section 25A of the NEPRA Act.

2.58. **Risk**

Combination of the frequency (likelihood) of occurrence of event/incident and the consequences (severity) of that event/incident.

2.59. **Risk Assessment/Treatment**

Overall process of Hazard identification, analysis, evaluation of risk level and application of controls.

2.60. **Safety Critical Protection Devices**

Safety critical protection devices, limit or stop the abnormal condition in system or flow of current in the event of a ground fault, overload, or short circuit in the circuit/ wiring system, whose failure can result in serious injuries, significant property damage or environmental impacts.

2.61. **Short Term Exposure Limit (STEL)**

The maximum concentration to which workers may be exposed for a period of time up to 15 minutes continuously without suffering irritation, chronic tissue damage, or narcosis which may lead to accidental injury. In addition, exposure to STEL shall not be repeated more than 4 times per day. Information about STEL is found in Material Safety Data Sheet (MSDS).

2.62. **Severity**

Level of consequences/outcomes of an event/incident.

2.63. **Shall**

The term “shall” indicate a mandatory requirement.

2.64. **Should**

The term "should" indicates a suggested or optional recommendation.

2.65. **System**

A set of components working together as parts of a mechanism or an interconnecting network.

2.66. **Task**

A piece of work activity to be completed or undertaken.

2.67. **Task Steps**

Each separate part of a work activity.

2.68. **Time Weighted Average (TWA)**

Time-weighted average concentration for a normal 8-hour working day, and a 40-hour working week, to which nearly all workers may be repeatedly exposed day after day, without adverse effects. Information about TWA is found in Material Safety Data Sheet (MSDS).

2.69. **Tools**

A device, one held in the hand, used to carry out a particular task.

2.70. **Power Transformer**

An equipment to regulate the electric energy to step up (increase) or step down (decrease) voltage levels.

2.71. **Turnaround**

Turnaround is a scheduled/ planned stoppage of part or all of a plant/ grid/ sub-station operations for maintenance, repair, improvement, replacement or upgradation of equipment.

2.72. **Utilities**

Essential facilities that support the operation and maintenance such as fuel, water, steam, electricity, compressed air and telecommunication, etc.

2.73. **Vehicle**

A mode of transportation that carry passengers, goods, or equipment from one location to another, powered by an engine, motor, or human effort, and is used across various domains, including land, water, air, and rail.

2.74. **Visitor**

Visitor means a person, other than a regular employee, contract employee or daily wages worker, permitted to enter a work area under permission by the authorized person.

2.75. **Waste**

A substance, material, or by-product generated during operation in solid, liquid, or gaseous form that is no longer useful or needed, required to be disposed.

2.76. **Worker**

A worker is any individual who performs work or work-related activities assigned by the company under various arrangements, whether paid or unpaid. This includes regular, contractual, daily wages, temporary, intermittent, seasonal, casual, or part-time work that is falls under the control of the company. Workers include all levels of staff, including top management, line management, and support staff.

2.77. **Worksites**

Includes company owned and directly managed properties.

2.78. **Workplace**

Place under the control of the company where a person needs to be or to go for work or work-related activities.

3. General Instructions

3.1. The company shall ensure compliance with Power Safety Code, together with NEPRA Performance Standards Rules, Grid Code, Distribution Code and Consumer Service Manual and other applicable national and provincial legal requirements, as applicable. The Safety Code enables the company to operate in a manner that protects and promotes the well-being and safety of its employees, contractors, the general public, visitors, animals while also protect the environment and assets.

3.2. When any portion or section of this Code is considered unsuitable or impractical for implementation, or when compliance with other industry standards or codes is preferred, or when conflicts or deviations arise between this Code and other industry standards or codes, a clarification should be sought regarding these conflicts or deviations, along with appropriate justification and reasoning. The decision made by NEPRA shall be final and binding.

3.3. The company shall establish, implement, monitor and maintain a system to identify Health, Safety and Environment (HSE) hazards and to reduce risks to "As Low as Reasonably Practicable" (ALARP).

3.4. The company shall promote a HSE culture, provide safe and healthy workplace. The company shall ensure that safe working is integrated into every aspect and area of business. Safety culture shall be based on personal leadership, commitment, collaboration and active involvement.

3.5. The company shall foster openness and dialogue, and be open to the HSE concerns of employees, contractors and other interested parties. It shall also be ensured that HSE requirements are known, understood, implemented and applied at all levels.

3.6. The company shall treat all injuries, occupational illnesses and HSE incidents as preventable and establish specific targets and goals of achieving zero occurrences for each type of incident.

4. Resources

4.1. The company shall be responsible to utilize its own resources for the planning, establishing, implementing, maintaining, monitoring, and communicating (both internally and externally) of the HSE system to avoid injuries to employee, contractor, visitor, member of general public, animals, loss of equipment/ property or adverse impact to the environment.

5. Non-Compliance to Power Safety Code

5.1. Non-compliance with the requirements of the Power Safety Code and other applicable documents, the Authority may initiate legal proceedings under the relevant provisions of NEPRA laws.

5.2. The Authority may order investigations under section 27A of the NEPRA Act against any licensee, NEPRA's concurrence holder, generation company, or a registered person, if found in violating the NEPRA Act, its rules, regulations and codes made thereunder or the conditions of a license issued or registration granted under the NEPRA Act, as the case may be.

6. HSE Policy

6.1. Top management shall establish, implement and maintain a HSE Policy, by including a commitment to provide safe and healthy working conditions, eliminate hazards and reduce HSE risks for the prevention of work-related injury, ill health and to protect the environment within the national and provincial legal requirements.

6.2. The HSE Policy shall address continual improvement of the HSE system, ensure workers involvement, and be communicated to all relevant stakeholders and interested parties.

6.3. The company shall ensure that the policy statement is reviewed within specified time and amended to reflect changes in the company or statuary requirements.

7. HSE Management System Requirements

a. The licensee, NEPRA's concurrence holder, generation company, registered person, or a network owner with a connection agreement, power purchase agreement, relevant contract or among others, shall plan, establish, implement, maintain, communicate (both internally and externally), and continually improve an "Occupational Health, Safety & Environment (HSE) Management System/Manual" in accordance with the terms and conditions of the license, concurrence, registration, connection agreement, power purchase agreement, or relevant contract for safe, efficient, and reliable operations including but not limited to construction, operation, maintenance, turnaround, rehabilitation, standby, decommissioning, mothballing, and demolition depending upon its own requirements, organizational needs, types of activities, processes, products, services and risks/ aspects. The company shall cover all its operational sites and adopt industry's best practices and standards related to its work activities besides compliance to Power Safety Code and other requirements.

b. The licensee, NEPRA's concurrence holder, generation company, registered person, or a network owner with a connection agreement, power purchase agreement, relevant contract or among others shall prepare, review, legally vet, concur, and approve its HSE Management System/Manual periodically to ensure its suitability and effectiveness according to organizational needs, as well as its alignment and compliance with the Power Safety Code and other applicable requirements.

c. HSE Management System/ Manual shall clearly define the necessary actions and measures to be taken by Licensee to prevent harm to company employees, contractor personnel, visitors, general public, animals, natural environment and damages to property.

d. Roles and responsibilities shall be clearly identified and documented in HSE Management System/ Manual for all positions/ functions that are responsible for the control of system of construction, installation, operation, maintenance, testing, turnaround, and HSE critical activities. Roles and responsibilities shall be communicated to responsible and interested parties. It shall also cover operational interface or joint responsibilities of each job step by agreement, where required.

e. HSE Management System/ Manual shall cover all definitions, glossary, abbreviations of all important terms and words being used.

f. The licensee, NEPRA's concurrence holder, generation company, registered person, or a network owner with a connection agreement, power purchase agreement, relevant contract or among others shall implement its HSE Management System/ Manual accordingly to

eliminate or prevent incidents.

g. The licensee, NEPRA's concurrence holder, generation company, registered person, or a network owner with a connection agreement, power purchase agreement, or relevant contract, shall submit its approved HSE Management System/ Manual as and when directed by NEPRA.

h. The written HSE Management System/ Manual shall address the following sections/sub-sections as applicable as per work activities and job scope.

7.1. Compliance to the Legal and other Requirements

7.1.1. The company shall obtain all necessary approvals, permits, and licenses from the relevant Federal and Provincial Government authorities.

7.1.2. The company shall prepare and maintain a legal compliance register for national, provincial and other legal requirements as applicable regarding Health, Safety and Environment (HSE), including this Code as applicable, such as but not limited to:

- The Canal and Drainage Act, 1873
- Electricity Act 1910,
- The Boilers Act 1923,
- Regulations of Mines Act 1923,
- Factories Act 1934,
- The Petroleum Act 1934,
- Electricity Rules 1937,
- The Petroleum Rules 1937,
- Gas Cylinder Rules 1940,
- Civil Defense Rules 1951,
- West Pakistan Factories Canteen Rules 1959,
- The West Pakistan Hazardous Occupation Rules 1963,
- Pakistan Nuclear Safety and Radiation Protection Ordinance 1984,
- Civil Defense Ordinance 1987,
- Pakistan Environmental Protection Act 1997,
- Pakistan Environmental Assessment Procedures 1997,
- Environmental Sampling Rules 2001,
- National Environmental Quality Standards November 26, 2010,

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- Boilers & Pressure Vessel Ordinance 2002,
- Mineral and Industrial Gases Safety Rules 2010,
- Explosives Rules 2010,
- Hazardous Substance rules 2014,
- Building Code of Pakistan Fire Safety Provision 2016 and so on.

7.2. HSE Management Team

7.2.1. The company shall establish an independent and functional Directorate/Department of Occupational Health, Safety, and Environment, staffed by dedicated, qualified, full-time experienced, and trained personnel within the HSE cadre under the direct control of Chief Executive Officer, Managing Director or equivalent position.

7.2.2. HSE management team should be deployed to oversee critical activities.

7.2.3. Responsibilities and duties of the HSE management team shall be clearly defined.

7.2.4. The minimum number of HSE personnel for generation, transmission, distribution activities and enabling functions, shall be evaluated on a case-to-case basis, depending upon the level of risk, the criticality of activities, service territory & jurisdiction and the need for the supervision. Moreover, HSE positions shall not be filled by irrelevant officials without relevant qualification and certification. The appointed/deputed HSE personnel shall be experienced and competent with technical background for the defined roles and responsibilities and possess at least one of the approved safety qualifications, such as ISO-45001, CSP, ASP, NEBOSH, NVQ, NFPA 70E, or any other approved HSE qualifications, certificates, diplomas, or degrees including knowledge of international standards and codes such as ISO-14001, ANSI, ASTM, IEEE, IEC, NFPA and other applicable legal requirements.

7.2.5. Appropriate job specific training should be planned and arranged to the HSE personnel within the HSE Directorate/Department, as deemed necessary.

7.2.6. The table below provides the minimum number of contractor HSE staff, required at construction project site or turnaround:

Table: Contractor Minimum HSE Staff Requirements			
Total No. of Employees	**HSE Manager or Equivalent Position Required**	**Minimum No. of HSE Supervisor(s) Required**	**Minimum No. of HSE Officers/Inspectors Required**
1 to 9	No	No	Shall be supervised by Client
10 to 25	No	No	1
26 to 50	No	1 Supervisor	1
51-250	Yes	2 Supervisor	2
251 to 500	Yes	3 Supervisor	1 HSE Officer/Inspector for 50 Employees (or part thereof)
501 to 1,000	Yes	1 Supervisor for every 10 safety Officers/Inspectors (or part thereof)	1 HSE Officer/Inspector for 50 Employees (or part thereof)
1,001 to 5,000	Yes	1 Supervisor for every 10 safety Officers/Inspectors (or part thereof)	20 HSE Officers/ Inspectors plus additional 1 HSE Officer/Inspector for 100 Employees (or part thereof)
5,001+	Yes	1 Supervisor for every 10 safety Officers/Inspectors (or part thereof)	60 HSE Officers/ Inspectors plus additional 1 HSE Officer/Inspector for 150 Employees (or part thereof)

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7.2.7. The company shall upload HSE staff contact details at NEPRA's Data Exchange Portal as mentioned in Annexure-1 "HSE Team Contact Details" within seven (07) working days. Upload the revised and updated contact list, in case of new recruitment, transfer, resigned or in case of HSE organization change.

7.2.8. Corporate-level and/or site-level organogram shall be maintained for company and Long Form Contract (LFC) contracts, including but not limited to contractors for project/construction, operation, and maintenance. Contractors working on company premises such as restaurants, shops, banks, and mail/courier services are excluded.

7.2.9. Long Form Contract (LFC): A form of contract where either the value of the contract exceeds $250,000 or the duration of work is more than six months.

7.2.10. Short From Contract (SFC): A form of contract where the value of the contract is less than or equal to $250,000 and the duration of work is less than or equal to six months.

7.3. Communication Protocol

7.3.1. The company shall establish, implement and maintain Internal and External Communication Protocol with authorization and availability of nominated/ focal person for proper coordination and system control to avoid an incorrect, incomplete, inadequate or misleading communication, to communicate clear information message, to the right people at the right time, to control and monitor construction, installation, operation, maintenance, testing, turnaround and HSE critical activities.

7.3.2. Critical information/ message should be to the point, brief, clear and simple manner. However, it should be ensured that information is received and completely understood by internal, external affected group, next shift personnel, contractors and end-user. All such critical communication shall be recorded in soft or hard form for a period of minimum one fiscal year.

7.3.3. The line management shall identify communication deficiencies during job activities to avoid potential injuries. The line management shall correct poor communication, which can cause confusion, misinformation/misleading, and worker failure to implement SOP's including workers' inability to communicate critical information.

7.4. Risk and Impact Management

7.4.1. The company shall conduct Hazards/ Aspect Identification and Risk/ Impact Assessments to assess potential risks to employees, contractors, visitors, general public, animals and impact to natural environment, by eliminating or reducing Safety & Health Hazards and Environmental Aspects that arise from the operations, maintenance and activities, in order to ensure that all risks are identified in detail and reduced to As Low as Reasonably Practicable (ALARP) to avoid future incidents associated with:

a. Employees, contractors, visitors, general public and animals.

b. Workplaces (hazardous locations).

c. Materials.

d. Equipment.

e. Operations, processes, maintenance, and activities.

7.4.2. Only one independent potential failure, deviation or accident with the worst-case scenario shall be assessed at a time.

7.4.3. Consideration shall be given to the following potential hazards, as applicable:

a. Potential fire and electrical (shock and arc flash) hazards.

b. Potential ignition sources such as personal smoking materials, hot work in the area, open flames, mechanical friction and sparks, impact sparks, hot surfaces & equipment, thermal decomposition, electric sparks and electrostatic discharge.

c. Potential hazards that may be encountered from outside sources.

d. Hazardous materials identification, handling and storage.

e. Human Factor Engineering.

f. Probable Human Factors.

g. Compliance of legal and other requirements.

h. Potential Hazards above ground level such as fall of a person from height, fall of objects from height, overhead power lines, loose sag, less clearance from the houses/ buildings/ trees, poles, fuel, chemical, hazardous dust/ fumes, pressure vessels/ boilers and so forth.

i. Potential Hazards on ground level such as electrical wires, electrocution, flash over, patrolling of lines, trimming of trees, excavation, hazardous area classification, night time operations, failure of tools, failure of a plant, buildings, possible flood, adverse weather conditions, thunderstorm, high wind, fog, rain, lightning or hazards from nearby plants or industry. Hazard created by building, facilities, workplaces, ergonomics, machinery, equipment, vehicles at workplace, tools, utilities, In-coming and Out-going material/ chemicals/ substances/ product/ waste, hazardous dust/ fumes, working over/ under or adjacent to water, routine/ non-routine and emergency activities or natural hazards.

j. Potential underground hazards such as buried utilities, high water table, building foundations, underground wastewater, unstable soil, chemical/ trash dump area, ash storage, voids in the earth (caves) and underground fuel/ chemical storage and hazardous dust/ fumes.

k. Hazards related to movement of vehicles (ground settlement and road cracks) from both inside and outside the facility of the company.

l. Identify Environmental Aspects. All identified significant environmental aspects shall be treated and handled in compliance with applicable national and provincial

legal requirements.

m. Identify existing preventive controls for each identified hazard and provide recommendation(s) for additional control(s) for high risks to reduce risk levels to As Low as Reasonably Practicable (ALARP).

n. Risk/Impact Assessments shall be reviewed by a competent team, representatives from Technical, Design, Engineering, Construction, Operations, Maintenance and HSE departments including involved contractor to assess the inherent risk at least every three (03) years, or in case of a major emergency, or a change in equipment or process, or a chemical or new critical Risk/Impact identified during study, or internal/ external audit recommendations, as deemed necessary.

7.4.4. Application of Controls

Depending on the nature and scale of the hazard under assessment when determining controls, or considering changes to existing controls, consideration shall be given to reducing the risks according to the following hierarchy:

a. Elimination,

b. Substitution,

c. Engineering Controls,

d. Administrative Controls,

e. Personal Protective Equipment.

7.5. HSE Meetings

7.5.1. The company shall plan and conduct HSE Meetings at top management level on quarterly basis to address the following:

- Review previous minutes of meeting.
- Review the implementation and compliance of this Power Safety Code.
- Review Annual HSE Goals, Objectives and KPI's for effective implementation.
- Discuss HSE Performance and Statistics.
- Discuss Near Miss/ Incident Alert as lessons learnt.
- Discuss critical Near Miss or Safety Suggestion, if any.
- Review training plan and records.

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- Discuss safety issues related to operations, contractors, tools, equipment, work environment and work practices with proper resolution for mitigation.

7.5.2. Attendance record shall be maintained for the period of one fiscal year.

7.5.3. Meeting minutes shall be recorded, distributed and posted at notice board within three (03) working days.

7.6. HSE Orientations

7.6.1. The company shall develop and conduct the HSE Orientation (Multi-Language), for all new employees and contractors to help them get familiarized with the company HSE policy, HSE system and safety rules, site specific hazards and PPE requirements, response in case of an emergency, other important company safety and security requirements.

7.7. Job Specific Trainings

7.7.1. A lack of effective training can lead to workers becoming overconfident and complacent, resulting in injury or death. Employees who are well-trained are more productive and safer. In order to maintain a high level of training, company shall review, continuously improve, and update the training program periodically.

7.7.2. The company shall conduct training need assessment and develop periodic plan to provide technical training / job skills competency training/ activity specific training/ vocational training (in-house or external), primarily for new employees or new contractor, or refresher training for those who have not been appointed as skilled, competent and authorized technician, electrician, wireman, or those who currently perform work beyond their obligatory scope of competence.

7.7.3. Skilled based training courses of short duration should be designed for the field staff to focus on the essential skills required to perform their job safely and effectively. Past accidents case studies should be made part of these training courses to increase awareness among the relevant field workers.

7.7.4. Trainer on any specific training topics should be nominated on the basis of training courses, knowledge and experience. Arrange specialized trainings for in-house trainers to enhance their Knowledge and skills. A good trainer will produce more skilled, safe and efficient worker and will be beneficial for the company. The company shall not assign risky people as in-house trainers for training of staff. People do what they are taught, so a bad trainer creates a risk taking worker, and the cycle continues

until they are broken.

7.7.5. The Job Skills Competency Training/ Activity Specific Training shall also comprise but not be limited to the following aspects as per job trade of a person:

a. HSE Principles.

- Identification, elimination, controlling of Hazards/ Risks to avoid incidents,
- Identification of unsafe conditions/ acts for safe operation.

b. Examples of unsafe conditions;

- Improper Guarding,
- Defective material or equipment,
- Hazardous arrangements,
- Hazardous weather,
- Hazardous place of work,
- Insufficient lighting,
- Improper ventilation,
- Unsafe Design & Construction.

c. Examples of Unsafe Acts;

- Operating without Authority or Warning,
- Working without PTW, when required,
- Operating or Working at unsafe Speed,
- Making safety devices In-operative/bypassing,
- Use of unsafe equipment or improper use of equipment
- Unsafe Loading,
- Placing or leaving objects unattended,
- Mixing improper Packing,
- Taking unsafe Position or Posture,
- Working on equipment without taking proper precautions,

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- Non-vigilant and inattentive behavior,
- Distracting, Teasing or Startling,
- Failure to use safe clothing or protective equipment.

d. Operations & Maintenance

- Safe Electrical Work Practices,
- Operations & Maintenance Manual/ SOP's/ Work Instructions,
- Shift Duties,
- Reporting of duty in an unfit condition,
- Assistance from employees not on duty,
- Identification of operating equipment,
- Arc Flash, Shock Protection and PPE selection,
- Operation, Maintenance and in-service Inspection of Equipment,
- Boiler, Turbine, Compressor, Generator, Cooling system,
- Status change of Interlocks, breakers and isolators.
- Fire Precautions,
- Working in a confined space,
- Working on road,
- Working at height,
- Work in Substations/ Grid/ Hazardous Area,
- Weather information,
- Interference of animals,
- Visitors,
- Working of employees of other organizations.

7.7.6. Provide refresher technical training/ job skills competency training/ activity specific training/ vocational training in case of a major incident or change in equipment, process or chemical or new critical risk identified, and/or internal/ external audit recommendation or change/amendment in the applicable law or technology.

7.8. HSE Awareness Trainings

7.8.1. The company shall provide information, instruction, training and supervision to all their employees and contractors as far as necessary, to understand processes and risks, as governed by the national and provincial legal requirements, to ensure the safety of all personnel at the work place, and for protection of equipment & the environment.

7.8.2. HSE awareness training plan/schedule shall cover following HSE related topics but not be limited to; hazard identification, risk assessment, isolation (logout/tagout), work permit training, electrical safety, PPE, fire watch, standby man, fire prevention, first aid, working at height, confined space and emergency & rescue, waste management and environmental protection, etc.

7.8.3. HSE awareness refresher training should also be planned once in every two (2) to five (5) years according to the validity of the training and nature of competency/ skill/ work area or in case of a major incident or change in equipment, process or chemical or new critical risk identified, and/or internal/ external audit recommendation or change/amendment in the applicable law or technology.

7.8.4. The company HSE Directorate/Department should annually launch a Public Awareness Campaign, a month before the monsoon season for Electrical Safety within its service territory and jurisdiction, including public spaces, residential areas, offices, educational institutions, healthcare facilities, commercial, agricultural, construction, and industrial sites. This campaign should cover safety precautions, including, but not limited to:

7.8.4.1. Install overcurrent protective devices, fuses, or circuit breakers of the correct rating in electrical systems for residential units, offices, educational institutions, healthcare facilities, commercial, agricultural, construction, and industrial sites. For human protection, it is recommended to install a Residual Current Circuit Breaker (RCCB) or a Residual Current Device (RCD). These breakers detect leakage currents, such as when electricity flows through a person due to a fault, and disconnect the circuit to prevent electric shock. An RCCB/RCD with a 30mA sensitivity is commonly used for household protection, as it quickly detects even small current leaks and disconnects the power to minimize harm. Additionally, using an RCBO (Residual Current Breaker with Overcurrent Protection) can provide combined protection against both leakage currents and overcurrent/short

circuits. This will minimize the potential for electric shocks, fires, or equipment damage resulting from faults or short-circuit currents. Additionally, install a permanent earthing system to prevent electrical accidents. It ensures that any fault current when developed will directly flow to the ground, reducing the risk of electric shock, fire or equipment damage. The earthing system offer protection during overcurrent protective devices, fuses, or circuit breakers failure. Both systems should be designed to work together to protect human lives, equipment, and property. Upon installation of these protective mechanisms, consumers shall arrange annual tests and maintenance by a qualified electrician for these protective mechanisms including faulty wires, fittings, holders, switches, sockets, plugs, lamps, fans, heaters, geysers and others appliances.

7.8.4.2. Use three-pin plug instead of a two-pin plug for appliances and equipment's within residential units, offices, educational institutions, healthcare facilities, commercial, agricultural, construction, and industrial sites. Three-pin plug is primarily for safety reasons. Each of the three pins in the plug serves a distinct purpose:

- Live (or Hot) Pin: This pin provides the current to the appliance.
- Neutral Pin: This pin acts as the return path for the current.
- Earth (or Ground) Pin: This is a safety feature that provides a path for fault currents to flow to the ground, reducing the risk of fire or electric shock to the person while touches the live conductor or faulty appliances.

7.8.4.3. Keep a distance of 3 meters (10 feet) from the electric pole during rain.

7.8.4.4. Keep children away from electric poles and wires, especially in rainy weather.

7.8.4.5. Install electrical switches, sockets, plugs, holders, wires and extension cords at a suitable height, out of the reach of small children, fire and water.

7.8.4.6. During rainy season, avoid ringing the doorbell.

7.8.4.7. Never touch electrical appliances with wet hands or bare feet, it can be fatal.

7.8.4.8. Turn off the power and unplug the cord before making any adjustments to domestic or commercial appliances.

7.8.4.9. If the electrical switch board or appliances are wet or submerged in water, do not use them. Call a qualified electrician to check the appliance before use.

7.8.4.10. When connecting two electrical cables, first wrap electrical tape around the exposed wires then apply waterproof tape, heat shrink tubing, or connectors to seal the connection and prevent moisture ingress during rain.

7.8.4.11. Don't use metal wire or poles to dry clothes.

7.8.4.12. Use protective conduits for all indoor and outdoor electrical wiring.

7.8.4.13. Overhead consumer service cables shall not be routed over or near the rooftops of consumer premises buildings or structures unless absolutely necessary, and in such cases, proper clearance and protective conduits must be used. Additionally, these consumer service cables shall not be routed above or on the rooftops or structures of other consumer buildings or properties.

7.8.4.14. Replace broken and defective electrical wiring, switches, sockets, plugs, holders and wires immediately otherwise they may cause accidents.

7.8.4.15. Don't insert bare wires directly into an electrical socket. Use a plug to be safe.

7.8.4.16. Don't overload electrical switch, socket, plug and extension cords as it may lead to overheating and fire.

7.8.4.17. If there is no electricity or electrical appliances are not in use, turn them off and unplug them.

7.8.4.18. Don't install direct hooking (kunda connection), there is a risk of electric shock and fire.

7.8.4.19. Don't construct or extend the building under or near power lines. Maintain minimum safe clearances for overhead bare conductors from the vertical clearance above rooftops or horizontal clearance from the house, building or structure side, shall be,

No.	Voltage AC	Vertical	Horizontal
1.	400 Volts and below	8 feet (2.4 meters)	4 feet (1.2 meters)
2.	11 kV	12 feet (3.7 meters)	6 feet (1.8 meters)
3.	33 kV	12 feet (3.7 meters)	6 feet (1.8 meters)
4.	66 kV	20 feet (6.1 meters)	15 feet (4.6 meters)
5.	132 kV	20 feet (6.1 meters)	20 feet (6.1 meters)
6.	220 kV	21 feet (6.4 meters)	21 feet (6.4 meters)
7.	500 kV	25 feet (7.6 meters)	25 feet (7.6 meters)

Note-1: Roofs, especially those accessible for use as terraces or recreational areas, might require higher vertical clearances than sloped roofs. Roofs with installations such as solar panels, water tanks, or air-conditioning units might require more clearance for safety.

Note-2: Extra horizontal clearance is needed near windows, terraces, balconies or any extensions to prevent easy access to conductors.

7.8.4.20. If the minimum safe vertical clearances above rooftops or the horizontal clearance from the side of a house, building, or structure are not met for overhead bare conductors, immediately contact the relevant Power Distribution Company to relocate the conductors or install insulated conductors in accordance with the Consumer Service Manual.

7.8.4.21. Shifting metallic materials at height near live conductors is highly dangerous due to the risk of electric shock or short circuits. This includes items such as metallic ladders, iron bars, metallic pipes, metallic scaffolding planks and tubes, metallic tools, metallic containers/buckets/drums, metallic roofing sheets, metal panels/plates, steel chains, metallic wire ropes, metallic furniture such as desks, chairs, filing cabinets or beds, metallic doors, gates, poles or wire mesh, and metallic conduits or ducts. To ensure safety, follow these precautions:

a. Contact the relevant Power Distribution Company to arrange a power shutdown before shifting any material.

b. Keep a safe distance from live conductors.

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c. Use non-metallic ladders, scaffolding material, and tools near live conductors.

d. Wear appropriate PPE such as insulated gloves, sleeves, non-conductive helmet and safety shoes.

e. Use dry physical barriers or guards to prevent accidental contact with live conductors, such as voltage-rated portable rubber insulated floor mats, insulated working supports or blankets, rubber/plastic plates, or any other non-conductive objects like plywood barriers.

7.8.4.22. Don't fly kites near power lines as the kite metallic or wet strings can cause an electric shock.

7.8.4.23. Don't tie your livestock or pets to electric poles or wires.

7.8.4.24. Avoid planting vegetation or trees under or near to electrical installations and power lines.

7.8.4.25. Don't excavate near power lines or dig boreholes for water. Contact the power company for guidance.

7.8.4.26. Don't drive or park overloaded vehicles beneath power lines.

7.8.4.27. Don't approach or cross power lines or poles if they fall, notify the power company immediately.

7.8.4.28. If power lines are broken and fell into the water, don't touch conductor or step into the water, assume that there is current in it.

7.8.4.29. Don't touch or remove anything that comes in contact with a power line, notify the power company immediately.

7.8.4.30. Repair your dedicated transformer only at the manufacturer's facility, the Distribution Company's own workshop, or an authorized private workshop, equipped with appropriate testing facilities to ensure reliability and integrity.

7.8.4.31. Emergency Guidelines for Electric Shock Victim

a. If a person is electrocuted, disconnect the power by turning off the switch.

b. Do not touch the electrocuted victim directly. Make sure you are standing on a dry, non-conductive surface to avoid getting electrocuted yourself. Disconnect the power or remove the electrical wires with non-

conductive materials like a dry broom, plastic, rope or wooden stick.

c. After the victim is free from the electrical source, only provide first aid, such as CPR if needed.

d. If the victim's clothing has caught fire, extinguish it with a cloth or towel or fire blanket.

e. If a wound is bleeding, apply a clean bandage to stop the bleeding. The patient often dies from excessive bleeding.

f. It is not a correct practice to hit a victim with a stick on their feet or forearm in the case of electrocution. Don't bury or cover the electrocuted victim in mud or sand, take the victim to the hospital immediately.

g. Don't try to feed the victim. The patient's condition may deteriorate if the airway is obstructed.

h. If the victim stops breathing or has no pulse, take him to the hospital with continuous CPR and artificial respiration.

7.8.5. NEPRA may issue safety flyers or alerts as necessary to promote safety awareness and reinforce key practices outlined in the safety code.

7.9. Control of Visitors and Animal Access

7.9.1. Gates and doors of the grid station, switchyard, substation and hazardous locations shall be kept closed and locked all times to prevent unauthorized entry.

7.9.2. The panels and covers of energized equipment and circuits shall remain closed at all times until the system is declared dead, both for preventive and corrective maintenance purposes.

7.9.3. Entry of unauthorized employees, contractors, visitors and vehicles to the construction, operation, or maintenance areas shall be controlled.

7.9.4. Visitor shall not be permitted access to the construction, operation, or maintenance areas unless accompanied by a company employee.

7.9.5. The host shall provide temporary PPE to visitors while they are visiting construction, operation, or maintenance areas. Upon completion of the visit, the temporary PPE must be returned to the designated storage location.

7.9.6. Access of stray or street animals shall be controlled.

7.10. Contractors, Sub-contractors & Suppliers

7.10.1. The Company shall enforce safety requirements to foster a strong safety culture across its sites, service territories, and jurisdictions by ensuring full compliance by contractors, sub-contractors, suppliers, bulk power consumers, and other system users, as outlined in this Code and any project-specific HSE requirements.

7.10.2. Contractors, sub-contractors, suppliers, bulk power consumers, and other system users shall prepare a safety plan as per the job scope, approved by the company and assign necessary HSE personnel accordingly to oversee safety during critical tasks.

7.10.3. Line Superintendent/Supervisor shall ensure that the Contractors, Sub-contractors & Suppliers and other system users brings their own PPE as stipulated in the agreement and shall not be allowed for any task unless equipped with required PPE.

7.10.4. Any accident occurring within the company site, service territory and jurisdiction, however, shall be the responsibility of the company therefore all activities carried out by contractors, sub-contractors & suppliers and other system users shall be controlled and supervised by company officials. Company shall take reasonable and necessary measures to prevent accidents involving employees, contractors, sub-contractors, suppliers and other system users during construction, operation, maintenance, turnaround, rehabilitation, standby, decommissioning, mothballing, and demolition works or tests under the contract.

7.11. Safety Instructions for Bulk Power / Single Point Supply Consumer.

7.11.1. Distribution companies shall include Bulk Power Consumer (BPC)/ Single Point Supply Consumer (SPSC) safety instructions in the connection agreement/contract and communicate safety instructions to BPC/SPSC through written letters, training sessions, workshops, or online resources.

7.11.2. BPC/SPSC shall follow all applicable rules and regulations already issued or to be issued in the future by the Distribution Company, NEPRA, or the relevant authorities.

7.11.3. Any BPC/SPSC committing a breach of the procedures/rules outlined above shall render itself liable for disconnection of its electric power and legal action.

7.11.4. Distribution Company shall develop a communication protocol with the BPC/SPSC. This protocol should have a designated and authorized focal person from each side to ensure effective coordination.

7.11.5. BPC's electrical installation shall confirm the design criteria of DISCO/NTDC and approved by the Distribution Company, as per the terms and conditions of the Consumer Eligibility Criteria, Performance Standards (Distribution) Rules, Distribution Code, Safety Code and Grid Code.

7.11.6. BPC/SPSC shall employ qualified and trained personnel to handle operations and maintenance.

7.11.7. All operation and maintenance activities shall be performed safely and in compliance with the BPC Procedure or SOP. Job supervisor shall conduct a job briefing before beginning tasks.

7.11.8. The job supervisor must confirm that his/her staff do not start work on the de-energized lines until isolation, lockout, and tagout procedures have been completed, and a work permit has been issued. Next, his/her staff use a contact or non-contact voltage tester, detector or beeper to confirm that the line is dead. Alternatively, line staff shall carry a personal or proximity voltage detector (with voltage ranges from 120VAC to 500kV) all the time while working to detect induced voltage from adjacent conductors or circuit, particularly if the earthing clamp is loose or not electrically connected.

7.11.9. The job supervisor must confirm that his/her staff provide temporary earthing on both sides of the line, whether it is high tension (HT) line or low tension (LT) line, to safeguard against potential energization of the line or monopole/tower/structure or back-feeding from consumer double supply lines, generators, UPS systems, stored charges from capacitors, lightning strikes, or induced voltage from conductors/ cables/ transformers. The job supervisor must ensure that his/her staff use electrical rubber gloves, rubber sleeves, and a full-body safety harness along with double lanyard with a positioning belt for work at heights, when necessary. When working in electrically conductive environments, use a Full Body Harness with PVC coated hardware or made from non-conductive materials like synthetic fibers or specialized fabrics with anti-static properties to minimize the risk of static discharge.

7.11.10. BPC shall arrange annual inspection and testing of electrical equipment, transformers, switchgear, distribution panels, and protective devices, including circuit breakers and protection relays. Ensure there are no defects, verify trip settings and configurations, and confirm that they are not bypassed, isolated, or deactivated.

7.11.11. BPC/SPSC shall ensure that all electrical equipment and systems are adequately grounded to prevent electrical faults and minimize the risk of electric shock and fire.

7.11.12. BPC/SPSC shall manage their electrical load efficiently and avoid overloading circuits, which can lead to overheating and potential fire/explosion.

7.11.13. BPC/SPSC shall repair its in-service equipment and transformers only at the manufacturer's facility, the Distribution Company's own workshop, or an authorized private workshop, equipped with appropriate testing facilities to ensure reliability and integrity.

7.11.14. BPC/SPSC shall have clear emergency procedures in place for dealing with electrical incidents, including power outages, fires, and electrical faults.

7.11.15. BPC/SPSC shall promptly report any electrical incidents, faults, or hazardous conditions to the Distribution Company and relevant authorities.

7.11.16. BPC/SPSC shall maintain records of safety training, incidents, and safety compliance at BPC/SPSC facilities at least for three (03) years, if not defined.

7.12. Top Management HSE Walk-through/ Site Tours

7.12.1. The company shall plan and conduct regular HSE walk-throughs and site tours at least once per quarter, attended by top management, across the company's site, service territory, and jurisdiction, including areas such as the network system, operational areas, grid yards, substations, compressor and pump areas, control rooms, pressure vessels, turbines, heat exchangers, cooling towers, stores, warehouses, fuel, oil and chemical storage, utilities, and loading/unloading areas.

7.12.2. During HSE walk-throughs and site tours, top management should engage with staff in the field, identify potential unsafe conditions, unsafe acts, near misses, housekeeping deficiencies, and other observations that may impact employee safety, facility protection, and environmental impact.

7.13. Standard Operating Procedure (SOP)/ Work Instructions

7.13.1. The company shall establish, implement and maintain "Standard Operating Procedure (SOP)/ Work Instructions" to describe: what to do, when to do and how to do, in accordance with manufacturer, operational, or maintenance manuals relevant to construction, operational, and maintenance risks to ensure that company activities are carried out in a safe and in an environmentally responsible manner,

promoting a secure and healthy workplace for employees and contractors.

7.13.2. SOP/ Work Instructions should provide a clear understanding of the detailed operating parameters and limits for safe operation, according to equipment manufacturer's manual, including an explanation of HSE consequences of operation outside the parameters and limits, and a description of steps to be taken to correct and/or to avoid deviations/ failure/ trip.

7.13.3. SOP/ Work Instructions should include following contents, as required depending upon company operations such as SOP Purpose, Scope, Definitions/ Abbreviations, Responsibilities, Operation Description, Potential Hazards, Safety, Health and Environmental Controls/ Precautions, Specific Engineering Controls, Specific Administrative Controls, Specific Personal Protective Equipment (PPE), Operation Modes (Temporary, Normal, Start-up, turnaround, Emergency), Operational Limits/ Parameters, Maintenance, Maintenance Override Switch (MOS), Records and Check Lists/ Log Sheets.

7.13.4. Work procedures, SOP's, practices, and training material shall be reviewed at least every three (03) years or, in case of a major incident or change in equipment, process or chemical or new critical risk identified, and/or internal/ external audit recommendation or change/amendment in the applicable law.

7.13.5. The company shall form a technical committee, composed of technical staff with knowledge of field to review work procedures, SOP's, practices, and training material for correct safe practices in the field.

7.13.6. The company shall provide adequate training and supervision to ensure all employees and contractors understand the required steps as defined in the SOP/ work instructions and perform their work accordingly.

7.14. Documents and Record Management

7.14.1. The company shall establish, implement and maintain HSE Documents and Record Management System either in digitized soft or hard forms, in order to ensure the effective control of documented HSE information.

7.14.2. The control of all types of documents created, used and maintained by company should include document creation, identification, numbering, revision, concurrence, approval, issuance, distribution, accessibility/ access control, change control, cancellation and periodic review.

7.14.3. This will ensure accessibility of the right information to the right personnel at the right time to prevent unintentional use of obsolete HSE documents/ information. HSE documents/ information should have identification, protection, storage, retrieval, retention, and authorized disposal of various Data and Records.

7.14.4. Critical records shall be retained and preserved by company as per equipment manufacturer recommendation, legal & other requirements or at least for three (03) years, if not defined.

7.14.5. Fiscal Year from July 1 to June 30, will be followed for HSE data and record.

7.15. Site Supervision

7.15.1. The company shall ensure effective coverage of critical high-risk activities under close and direct supervision to reduce incidents/ near misses. Chance of incident is higher during shutdown and start-up of plant, grid, equipment, network, and transformer after maintenance or during shift start and end time due to short cuts by employee or contractor to finish jobs.

7.15.2. Workers will take risks if no one is watching. Poor attitudes and behavior can be mitigated by close and proper supervision. An effective site supervision of workers' tasks reduces the likelihood of mistakes and accidents.

7.15.3. The Line Management, Resident Engineer, Executive Engineer or Sub-Divisional Officer shall verify necessary trainings/ refresher trainings of his/her team as per training plan.

7.15.4. The Line Management, Resident Engineer and Sub-Divisional Officer are responsible to ensure the work outcomes and safety, regardless of whether they supervise the activities directly or indirectly. Holding Line Management, Resident Engineer, and Sub-Divisional Officer accountable for their actions will prevent accidents caused by poor management oversight.

7.15.5. The Line Management, Resident Engineer, Executive Engineer, and Sub-Divisional Officer shall conduct regular field visits within their service territory and jurisdiction at intervals specified in the HSE/Safety Manual, or at least once in a week to proactively prevent serious accidents and ensure strict compliance with rules and SOP's. They shall record all HSE observations, including unsafe conditions, unsafe acts, near misses, housekeeping deficiencies, and any other issues that could impact the safety of the facility/network system, employees, contract workers, the general public, and animals. These observations should be recorded in their register/logbook

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for prompt action and immediate correction.

7.15.6. The Line Management, Resident Engineer, Executive Engineer or Sub-Divisional Officer must take a firm, consistent approach to willful violations to maintain discipline. They must recognize individuals who have a tendency to violate workplace rules/SOP's and give them appropriate counselling and coaching to improve their attitude to risky behavior, or remove the errant employee from the workplace to save his/her live.

7.15.7. The Line Management, Resident Engineer, and Sub-Divisional Officer must frequently remind Line Superintendents/Supervisors to conduct job briefings/toolbox talk at the start of each job and follow Safety rules and SOP's.

7.15.8. The Line Management, Resident Engineer, and Sub-Divisional Officer must confirm that his/her staff do not start work on the de-energized lines until isolation, lockout, and tagout procedures have been completed, and a work permit has been issued. Next, his/her staff use a contact or non-contact voltage tester, detector or beeper to confirm that the line is dead. Alternatively, line staff shall carry a personal or proximity voltage detector (with voltage ranges from 120VAC to 500kV) all the time while working to detect induced voltage from adjacent conductors or circuit, particularly if the earthing clamp is loose or not electrically connected. The Line Management, Resident Engineer, and Sub-Divisional Officer must confirm that his/her staff provide temporary earthing on both sides of the line, whether it is high tension (HT) line or low tension (LT) line, to safeguard against potential energization of the line or monopole/tower/structure or back-feeding from consumer double supply lines, generators, UPS systems, stored charges from capacitors, lightning strikes, or induced voltage from conductors/ cables/ transformers. The Line Management, Resident Engineer, and Sub-Divisional Officer must ensure that his/her staff use electrical rubber gloves, rubber sleeves, and a full-body safety harness with a positioning belt along with double lanyard for work at heights, when necessary. When working in electrically conductive environments, use a Full Body Harness with PVC coated hardware or made from non-conductive materials like synthetic fibers or specialized fabrics with anti-static properties to minimize the risk of static discharge.

7.15.9. Despite work-related pressures, the Line Superintendent/Supervisor must recognize and correct unsafe attitudes among his/her linemen/workers and not allow them to start work until they correct their unsafe behavior.

7.15.10. Line Superintendent/Supervisor must remain vigilant and keep an eye on worker to prevent unsafe acts/violations. In case of non-compliance or if the worker is taking short cuts, not following SOP's, remove worker from the team to save his/her live and arrange necessary training and coaching for him.

7.16. Accountability

7.16.1. Work-related accidents can be prevented when the leadership takes timely and proper safety measures to protect employees, contractors, and the general public. Similarly, employees and contractors have a duty to ensure their own safety and the safety of others.

7.16.2. The top management, whether in the role of Chairman, Chairperson, Board Members, Chief Executive Officer, Managing Director, Deputy Managing Director, Director General, Chief Financial Officer, Chief Operating Officer, Chief Technical Officer, Chief Administrative Officer, Company Secretary or equivalent position, holds strategic leadership roles with significant decision-making authority and are responsible for the overall success and growth of the company. They shall be responsible and accountable for planning, establishing, implementing, maintaining, monitoring, and communicating (both internally and externally) for providing a safe, decent, and healthy workplace for employees and contractors. Additionally, they are responsible and accountable for the occupational health and safety of employees, contractors, and the general public, as well as for minimizing damage to property and mitigating adverse impacts on the environment, directly associated with network owner's operations or infrastructure.

7.16.3. Top management shall motivate the staff to implement robust controls, provide resources and insist on strict compliance with rules and SOPs. There shall be zero tolerance for careless risk-taking or negligence to ensure accident prevention.

7.16.4. The top management shall promote a 'safety-first' culture, where poor attitudes and behavior are unacceptable. Set the initial safety expectation that nothing is more important than getting the job done safely and that poor behavior and attitudes are intolerable and can result to termination/dismissal from the service. Provide retraining, if individuals fail to meet safety expectations. If safety expectations are still not met, then remove personnel from the team if they cannot or are not willing to be align with the company's safety culture. Disciplinary action must be taken for the HSE noncompliance. Sometimes, harsh disciplinary action or even termination/dismissal, may be in the best interest of the individual to save his/her

life and the lives of others as well as to set an example for others. If necessary, apply termination/dismissal policy in line with the Industrial and Commercial Employment (Standing Orders) Ordinance, 1968 or any relevant legislation, so that he/she can find another safer job opportunity to support his/her family as a bread earner.

7.16.5. The line management includes roles such as Plant Manager, General Managers, Deputy General Managers, Managers, Deputy Managers, Assistant Managers, Directors, Deputy Directors, Assistant Directors, Chief Engineers, Superintending Engineers, Executive Engineers, Resident Engineers, Assistant Resident Engineers, Senior Engineer, Junior Engineer, Sub-Divisional Officers, Grid In charge, Sub Station Officer, Line Superintendents, Supervisors and Foremen or equivalent position, are directly involved in the operational roles at the site in managing the day-to-day field operations and shall be responsible and accountable for ensuring compliance with Health, Safety, and Environmental (HSE) requirements.

7.16.6. The line management shall set initial safety expectations for their team. If the safety expectations are not met, provide retraining to them. If expectations are still not met, then remove them from leading or working in the team, especially if they are not willing to be align with the company's safety culture.

7.16.7. The line management shall discipline staff who intentionally ignore and disregard safety rules and SOPs. If an individual consistently fails to comply, then the only option is to remove him/her from the risky tasks to save his/her life and the lives of others. Staff who are taking shortcuts have a higher tendency to disregard safety in the belief that nothing will happen since they have performed similar jobs or the same work before without following safety rules and SOP's. The safety rules are mandatory, therefore removal is beneficial to save a violator from making mistakes and possibly injuring himself or others at work.

7.17. Engineering and Construction Management

7.17.1. The company should establish, implement and maintain a section or unit for Engineering & Construction Management, which shall be responsible for managing engineering documents, conduct detailed engineering design, identify specifies requirements for the application of Standards, Specification, Rules, Regulations and Codes for Engineering & Construction works to avoid substandard construction and installation, specifies the protection devices and schemes, prescribes mandatory design bases and performance criteria of electrical power systems, specifies critical operational parameters, execution of electrical equipment and materials.

7.17.2. The company shall establish and maintain a system to ensure quality of work at site and adherence to the design steps during construction.

7.17.3. A single line diagram shall be displayed or made available in all electrical rooms within any facility.

7.17.4. Transformer, poles, structures, towers, conductors, and other electrical apparatus shall be installed in safe locations to avoid hazards to humans and animals. These installations can be at ground level, underground, or overhead, and shall be away from hazardous locations such as flood channel, etc. Existing transformer, poles, structures, towers, conductors, and other electrical apparatus in hazardous locations must be relocated or replaced with new ones in safe locations. Install guy/stay wires to stabilize poles and structures, marking them with high-visibility sleeves to prevent tripping hazards at public places. Install barriers or fences around high-voltage equipment to prevent unauthorized access. Clearly mark the location of underground electrical facilities to alert future excavation efforts. Install clear and visible signage indicating the presence of high-voltage equipment and potential hazards.

7.17.5. Abandoned or scrapped installed transformers, poles, structures, towers, conductors, and other electrical apparatus shall be de-energized and isolated from the power system. Remove all components, including poles, transformers, conductors, and any supporting structures or foundation, following safety protocols. Follow proper disposal procedures for electrical equipment, ensuring compliance with environmental regulations. Restore the site to its original condition or prepare it for new installations. Remove any debris and ensure the area is safe for future use.

7.17.6. All electrical installations and circuits shall be identify, designed, constructed and maintained to provide protection against the abnormal conditions (overload, short-circuits (whether phase-to-phase or phase-to-ground), and electric shock (due to direct or indirect contact with electricity), lines fall on rocks or any surface, which may cause injury to people, animal or damage to property, etc.) such as distance relay, overcurrent relay, over voltage relay, earth fault relay, and automatic self-closing relay including fixed earthing/grounding of circuits, apparatus and infrastructures.

7.17.7. ELCB (earth leakage circuit breaker), RCD (residual current device), RCCB (residual current circuit breaker) and molded case circuit breaker (MCCB) shall be used for

protection and control purposes as per design in circuits in order to prevent fires and shocks in electrical installations.

7.17.8. Protective relays and protection schemes set points/ sizes should be sufficient for the current rating to immediately 'blow' the fuse or trip the circuit breaker within the specified time, in case of fault or overcurrent.

7.17.9. Generation Company shall address dust zones wherever applicable, following the guidelines provided in NFPA 499, NFPA 654, and IEC 60079-10-2 to verify all inherent controls are in place and functional.

7.17.10. Generation Company shall maintain and operate in a manner that minimizes the escape of dust in Zone-20, 21 and 22 from process equipment or ventilation systems, wherever applicable. Continuous local exhaust ventilation should be provided for processes where combustible dust is liberated in normal operation so as to minimize the escape of dust. The dust should be conveyed to dust collectors.

7.17.11. Generation Company shall take appropriate measures to avoid dust suppression such as sprinkler water, etc. to increase air moisture levels, which can help reduce dust dispersion. This method is particularly useful in dry environments where dust is more likely to become airborne.

7.17.12. Ensure isolation or shielding of hot surfaces. Any hot surface at 65 degree Celsius and above, within the areas at site shall be insulated to reduce the possibility of auto ignition of dust, wherever applicable. Surface temperatures shall not exceed 260 degree Celsius. The minimum ignition temperature (MIT) for a dust cloud varies depending on the type of dust, but generally, it ranges from 400°C to 600°C.

7.17.13. All mechanical equipment installed in hazardous dust zone should be manufactured to ensure that rotating parts are non-sparking and adequately protected against the generation of a static charge.

7.17.14. Impulse noise exceeding 140 dB shall not be permitted in any plant area.

7.17.15. All design aspects/ design criteria shall be provided to NEPRA as and when required and complete record shall be maintained by the company.

7.17.16. Electrical conductors or circuit parts shall be suitably guarded, isolated, or insulated.

7.17.17. The network owner shall install safety guards, nets or screens beneath the span of existing and new conductors crossing roads, canals, or railways for 400 Volts and

below, 11 kV and 33 kV lines to ensure that the conductors do not make contact with the ground or other structures in case of breakage, which can pose significant risks to public and animals safety. Metallic safety guards, nets or screens shall be connected with fixed earthing at each point. In the event of a conductor breaking, the guard will catch the conductor, triggering the blowing of the fuse or tripping of the circuit breaker. The guard wire should be made of appropriate type, with an actual breaking load of at least 1,500 lbs and sufficient current carrying capacity to prevent fusing if the live line comes into contact with it.

7.17.18. Conductors of 400 Volts and below, 11 kV and 33 kV lines and its safety measures such as guards, nets, or screens spanning across roads, canals, or railways shall be free of joints.

7.17.19. Installing safety guards, nets, or screens beneath the spans of lines such as 66 kV, 132 kV, 220 kV, and 500 kV lines that cross roads, canals, or railways, may not be feasible due to the longer span lengths, the height of the towers, and the weight of the conductor. In such situations, an alternative safety measures should be considered as per design like vibration dampers for single conductor to reduce aeolian vibration and spacer dampers for bundled conductors to maintain the sub span oscillation and spacing, thereby mitigating the risk of potential conductor breakages. High voltage lines shall be protected by fast acting relay operated circuit breakers with a tripping time of even less than the order of 0.25 seconds from occurrence of fault to its clearance.

7.17.20. Each tower for these crossing spans, whether on roads, canals, or railways, must have fixed earthing system by two distinct earthing connections. Each of these connections should have its own dedicated earth electrode. If a tower's earth resistance exceeds 5 ohms, counterpoise earthing must be implemented.

7.17.21. In-service overhead lines crossing roads, canals, or railways shall be subjected to scheduled inspections to ensure their structural integrity and the safety of the crossing point.

7.17.22. The platform/grating structure shall be designed to withstand the imposed loads from equipment, materials, refractories, and other factors. It is crucial that all loads are evenly distributed to prevent any failure or deformation.

7.17.23. A safety corridor should be considered during design phase to protect the network systems from the flood, windfall, trees and branches and other potential hazards that may result in damage to the system, power failures or forest fires.

7.17.24. The headroom in the plant area or grid station, which provides vertical clearance for vehicles to pass safely beneath overhead structures such as bridges, tunnels, or pipes/structure, shall be a minimum of 18 feet (5.5 meters) across the full width of roads to allow the safe passage of emergency vehicles, cranes, and other tall vehicles.

7.17.25. The network owner shall install insulated conductors (aerial bundled cables/conductors/ABC) for new LT lines or while replacement of spoiled/worn-out bare conductors, especially in narrow, congested or overcrowded areas where there's limited clearance from trees, houses, buildings, or other structures. However for new HT Lines XLPE covered conductor (Tiger) shall be installed. Consideration should be given to the potential for physical damage to insulation. Insulation that comes into contact can suffer abrasion damage. To prevent such damage, tree branches should be trimmed, allowing for wind-induced movement of either the branches or the conductor without them touching the conductor insulation. These insulated conductors (aerial bundled cables/conductors/ABC) should be suitable for self-suspension, incorporating outer sheaths resistant to ultra-violet (UV) radiation, abrasion and the effects of external temperature variations and moisture. Utilizing insulated conductors will prevent accidental contact and can be positioned close to trees, houses, buildings, or other structures and will not generate sparks if touched.

7.17.26. The minimum safe clearances from the ground surface for overhead bare conductors at maximum conductor sag to prevent induced voltage or flashover in areas exclusive to pedestrians having no access to vehicles, as well as on roads and streets with heavy vehicles such as trucks, trailers, buses, or cranes, shall be,

No.	Voltage AC	Pedestrian Area	Streets	Roads & Highways
1.	400 Volts and below	15 feet (4.6 meters)	19 feet (5.8 meters)	26 feet (7.9 meters)
2.	11 kV	15 feet (4.6 meters)	20 feet (6.1 meters)	26 feet (7.9 meters)
3.	33 kV	18 feet (5.5 meters)	22 feet (6.7 meters)	26 feet (7.9 meters)
4.	66 kV	20 feet (6.1 meters)	24 feet (7.3 meters)	26 feet (7.9 meters)
5.	132 kV	23 feet (7 meters)	26 feet (7.9 meters)	26 feet (7.9 meters)
6.	220 kV	26 feet (7.9 meters)	30 feet (9.1 meters)	30 feet (9.1 meters)
7.	500 kV	30 feet (9.1 meters)	35 feet (10.7 meters)	35 feet (10.7 meters)

Note: The network owner shall increase clearance in accordance with the Consumer Service

Manual if it is reduced due to road or street construction.

7.17.27. The minimum safe clearances for overhead bare conductors at maximum conductor sag from the rivers and canals from highest flood level (HFL), shall be 30 feet (9.1 meters) for all voltages.

7.17.28. The minimum safe clearances from the ground surface for overhead bare conductors at maximum conductor sag to prevent induced voltage or flashover in areas crossing railway tracks, shall be,

No.	Voltage AC	Inside Stations	Outside Stations
1.	400 Volts and below	31 feet (9.5 meters)	24 feet (7.3 meters)
2.	11 kV	33 feet (10 meters)	25 feet (7.6 meters)
3.	33 kV	33 feet (10 meters)	25 feet (7.6 meters)
4.	66 kV	34 feet (10.4 meters)	26 feet (7.9 meters)
5.	132 kV	36 feet (11 meters)	28 feet (8.5 meters)
6.	220 kV	37 feet (11.3 meters)	29 feet (8.8 meters)
7.	500 kV	39 feet (11.9 meters)	30 feet (9.1 meters)

7.17.29. Whenever feasible, consider underground cabling when crossing roads, highways, and railway tracks with power lines up to 66 kV.

7.17.30. The minimum safe clearances for overhead bare conductors at maximum conductor sag from the vertical clearance above rooftops or horizontal clearance from the house, building or structure side, shall be,

No.	Voltage AC	Vertical	Horizontal
1.	400 Volts and below	8 feet (2.4 meters)	4 feet (1.2 meters)
2.	11 kV	12 feet (3.7 meters)	6 feet (1.8 meters)
3.	33 kV	12 feet (3.7 meters)	6 feet (1.8 meters)
4.	66 kV	15 feet (4.6 meters)	15 feet (4.6 meters)
5.	132 kV	20 feet (6.1 meters)	20 feet (6.1 meters)
6.	220 kV	21 feet (6.4 meters)	21 feet (6.4 meters)
7.	500 kV	25 feet (7.6 meters)	25 feet (7.6 meters)

Note-1: Roofs, especially those accessible for use as terraces or recreational areas, might require higher vertical clearances than sloped roofs. Roofs with installations such as solar panels, water tanks, or air-conditioning units might require more clearance for safety.

Note-2: Extra horizontal clearance is needed near windows, terraces, balconies or any extensions to prevent easy access to conductors.

Note-3: When a person comes into contact with a Low Tension (LT) or Low Voltage, the electrical current might not be strong enough to cause that immediate muscular contraction that throws the victim away. Instead, the person may be "locked/caught" onto the current.

Note-4: When a person comes into contact with a High Tension (HT) or High Voltage circuit, the immediate and strong muscular contraction caused by the electrical current often "throws" the individual away from the source. The electrical arcing can also physically push a person away from the source.

7.17.31. If the minimum safe vertical clearance above rooftop or the horizontal clearance from the side of a house, building, or structure are not met for overhead bare conductors, or in case of illegal construction or extension of the building under or near distribution or transmission lines that violate these minimum safe clearances, the network owner shall immediately issue a notice to stop unsafe construction until the conductors are relocated or insulated conductors are installed in accordance with the Consumer Service Manual. This notice shall be issued to the consumer or building owner, with copies sent to the local building department, the relevant civic authorities and the concerned police station. If the notice is not complied with within 24 hours, the network owner shall file an application with the concerned police station against the consumer or building owner to halt the illegal construction or extension of the building. Additionally, the network owner shall submit applications to the local building department and the relevant civic authority for the demolition of any illegally constructed or extended structures near or under the transmission or distribution lines.

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7.17.32. The minimum safe clearances between the overhead bare conductors phase to phase shall be; to ensures that there is no risk of electrical arcing or flashover between the conductors, even under adverse weather conditions,

No.	Description	400 Volts and below	11 kV	33 kV	66 kV	132 kV	220 kV	500 kV
1.	**Telecommunication, internet or television cable**	4 feet (1.2 meters)	6 feet (1.8 meters)	6 feet (1.8 meters)	9 feet (2.7 meters)	11 feet (3.4 meters)	13 feet (4 meters)	15 feet (4.6 meters)
2.	400 Volts AC and below	2 feet (0.16 meters)	6 feet (1.8 meters)	6 feet (1.8 meters)	7 feet (2.1 meters)	9 feet (2.7 meters)	11 feet (3.4 meters)	13 feet (4 meters)

3.	11 kV AC	-	4 feet (1.2 meters)	4 feet (1.2 meters)	7 feet (2.1 meters)	9 feet (2.7 meters)	11 feet (3.4 meters)	13 feet (4 meters)
4.	33 kV AC	-	6 feet (1.8 meters)	6 feet (1.8 meters)	7 feet (2.1 meters)	9 feet (2.7 meters)	11 feet (3.4 meters)	13 feet (4 meters)
5.	66 kV AC	-	-	-	10 feet (3 meters)	12 feet (3.7 meters)	14 feet (4.3 meters)	16 feet (4.9 meters)
6.	132 kV AC	-	-	-	-	12 feet (3.7 meters)	14 feet (4.3 meters)	16 feet (4.9 meters)
7.	220 kV AC	-	-	-	-	-	16.5 feet (5 meters)	18 feet (5.5 meters)
8.	500 kV AC	-	-	-	-	-	-	22 feet (6.7 meters)

7.17.33. The minimum safe clearances for high voltages AC or DC shall meet approved design criteria. The minimum safe clearances shall adhere to the most recent versions of ANSI, ASTM, IEEE, IEC, NFPA, or an equivalent engineering standard or specification, they shall be considered acceptable.

7.17.34. The Distribution Company shall verify the wiring test report, duly issued by the Electric Inspector or an authorized wiring contractor during the site survey/visit for new or re-connection.

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7.17.35. The distribution company is responsible for maintaining the integrity and safety of its network up to the electricity meter. Beyond the meter, the consumer is responsible for the service cables, premises wiring, and internal installations.

7.17.36. The energy meter should be installed in a well-ventilated, accessible area, preferably on an exterior pole/wall near the point of service entry to the consumer premises. The energy meter should be installed as close as possible to the consumer premises to minimize energy losses and ensure that the voltage does not drop more than 5% from 220 volts. The meter should be mounted at height to ensure easy access for readings and maintenance.

7.17.37. For new or re-connection, the Distribution Company shall ensure during the site survey/visit that, where feasible, underground consumer service cables for the

energy meter should be routed by the consumer through protective conduits, ducts, or trenches to prevent physical damage. These conduits, ducts, or trenches should be buried by the consumer at a depth of at least 18 inches (45 cm) to avoid accidental damage during ground works. Appropriate signage or markers should be installed by the consumer to indicate the presence of underground cables.

7.17.38. For new or re-connection, the Distribution Company shall ensure during the site survey/visit that the overhead consumer service cables for the energy meter should be installed by the consumer at a sufficient height to avoid interference with pedestrian and vehicular traffic. The minimum safe clearances from the ground surface shall be 15 feet (4.6 meters) in pedestrian areas, 19 feet (5.8 meters) over streets, and 26 feet (7.9 meters) near roads. These consumer service cables should be installed in a straight, secure manner without excessive sagging. If the length of consumer service cables exceeds 130 feet (40 meters) then the Distribution Company shall provide support by poles or structures in accordance with the Consumer Service Manual.

7.17.39. For new or re-connection, the Distribution Company shall ensure during the site survey/visit that the overhead consumer service cables shall not be routed over or near the rooftops of consumer premises buildings or structures unless absolutely necessary, and in such cases, proper clearance and protective conduits must be used. Additionally, these consumer service cables shall not be routed above or on the rooftops or structures of “other” consumer buildings or properties.

7.17.40. Power cable splicing, joining, and connecting shall be environmentally sealed, weatherproof, and capable of preventing the ingress of external moisture and contaminants, even under severe environmental condition or rain. When connecting two electrical cables, first wrap electrical tape around the exposed wires, then apply waterproof tape for additional protection. For a more durable connection, consider using heat shrink tubing or connectors.

7.17.41. The Distribution Company has the right to access a consumer's premises after providing written notice in accordance with the Consumer Service Manual. This access is for the purpose of internal inspection, examination, or testing of the consumer's electric system, service cable condition (secured with a shackle insulator, support or clamp), internal wiring, fittings, breakers, earthing, or any other internal apparatus. If any unsafe conditions or hazards are identified during the inspection, the Line Management/Sub-Divisional Officer or their representative

is responsible for issuing a notice with an appropriate solution and a reasonable completion target date. The notice remains open until the Line Management/Sub-Divisional Officer or their representative physically verifies that the consumer has implemented corrective actions. In cases of severe hazards, electricity may be temporarily disconnected until the consumer has addressed the issue.

7.18. Operation and Maintenance

7.18.1. All critical high risk activities including boiler/ turbine operations, turnaround/ start-up, access to high voltage system and high voltage switching operations, high voltage capacitor discharge, working in grid, substation, feeder, panels, transformer, overhead lines, regulator, single or multiple circuit, dead apparatus/lines, working at height, solvents cleaning, handling of toxic or hazardous materials, fiberglass thermal insulation, explosives, radioactive material, pressure vessels, underground man-holes shall be performed safely in compliance to Operation/ Maintenance Procedure, SOP, or Manufacturer's manual.

7.18.2. In order to prevent accidents, line management shall ensure robust job planning and job briefing before beginning tasks to fully communicate the roles and responsibilities as well as task-level scope, hazards, and controls, to all of the assigned workers. Job briefing should cover, what is to be done, how is to be done, and who is authorize to do it.

7.18.3. The company shall implement all necessary precautions to avoid any leakage of electrical current or hazardous energy from its system/ infrastructure to harm human life.

7.18.4. The network owner of street poles shall monitors and maintains system integrity to ensure the safety of the public and animals.

7.18.5. All electrical panels in public locations shall be locked.

7.18.6. A minimum clearance of 1 meter (3.2 feet) shall be maintained in front of electrical panels.

7.18.7. Bonding and grounding conductors shall be provided where needed to dissipate static charge accumulations.

7.18.8. Operation and maintenance activities shall be carried out by experienced, trained and authorized employees/ contractors. Alternatively, trainee or apprentice can work under the direct supervision of experienced, trained and authorized

employees/ contractors, to gain the necessary training and experience.

7.18.9. Normal operation of electrical equipment shall be permitted only when the equipment is properly installed, maintained, all doors are and covers are closed, grounded and there are no indications of impending failure or hazards.

7.18.10. Line staff must follow safety rules and SOPs at the work site, apply precautions based on the hierarchy of controls, and use necessary PPE. No work is important than their lives.

7.18.11. For all corrective and preventive maintenance activities, the line staff must not start work until they receive a permit to work and the Line Superintendent/Supervisor is present on the job site.

7.18.12. The Line Superintendent/Supervisor is responsible for enforcing safety rules, SOP's and PPE on the work site to prevent accidents.

7.18.13. Voltage testing including Hi-pot tests (AC/DC), power frequency, impulse voltage withstand tests and high current tests shall be performed safely in compliance to Operation/ Maintenance Procedure, SOP, or Manufacturer's manual.

7.18.14. Protections/ controls/ interlocks shall be intact and shall not be by-passed or modified without approved Management of Change (MOC).

7.18.15. Isolation shall be done for maintenance activities, whenever required.

7.18.16. Switching operations for isolation of the transmission network shall be well coordinated with relevant control center.

7.18.17. Safe working of remotely and automatically controlled equipment shall be established.

7.18.18. Combustible and flammable materials shall be removed from the area.

7.18.19. Gas/combustible dust testing shall be conducted as per Task Risk Assessment/ JSA/ Permit to Work at same elevation and above/ below elevation to test oxygen deficiency and/or for flammable or toxic gases, vapors and dust.

7.18.20. Electrical equipment and lighting, including flashlights, must be explosion proof and ATEX or IEC-EX rated for hazardous locations and confined space such as Class 1, Division 1 or 2.

7.18.21. Consider the non-sparking tools in the dust zone and flammable substances area to reduce this risk. Use techniques to prevent dropping tools, e.g. "drop tool kit, wrist

straps or tool ties.

7.18.22. Ensure absence of combustible dust before issuing a hot work permit.

7.18.23. Appropriate fire extinguishers shall be made available when hot work is being performed.

7.18.24. Gas cylinders shall be secured in an upright position with proper labels and a safety cap shall be installed when not in use.

7.18.25. Use cylinder trolleys, material baskets, cylinder racks, and other proper types of equipment to transport cylinders.

7.18.26. Cylinder must also be secured against falling by chains, web sling belts, or supports.

7.18.27. Use approved pressure-reducing regulators with a check valve connected to the cylinder valve on all cylinders.

7.18.28. Always close the cylinder valve before attempting to stop leaks.

7.18.29. Inspect cylinders for safe condition before use. Conduct soap test, inspect all gauges, valves, regulators, hoses, welding/cutting torches and cylinders for damage and valid hydro test date.

7.18.30. Compressed gas cylinders shall be hydrostatic pressure tested. The valid test date shall be indelibly marked on the cylinder.

7.18.31. Protect cylinders from direct flame, sunlight, and other heat sources.

7.18.32. Place flashback arrestors at oxygen, acetylene/other fuel type cylinder regulators.

7.18.33. Properly identify and label empty and filled cylinders.

7.18.34. Compressed gas cylinders shall be kept outside while working inside confined space.

7.18.35. All power-driven tools, equipment and heavy equipment shall be inspected before use.

7.18.36. Use portable earth leakage circuit breaker (ELCB) for portable equipment's and tools to prevent electric shock.

7.18.37. Every part of electric generators, turbines, motor or rotary converter, fly wheels or transmission machinery shall be securely guarded and fenced unless they are safe by position or construction.

7.18.38. Car seals are simple plastic devices used to 'seal' a valve in the open or closed

position to prevent unauthorized operation of the valve. Valve operation can only take place by cutting the seal, thereby giving evidence of either tampering, or activity by an authorized worker. A car seal is used to seal the valve during plant operation. Control of valves refers to those valves that are normally opened or closed as defined in the “As Built/Controlled" drawing from the safety point of view. It does not apply to valves that normally open and close during normal plant operation. Car sealed valve hand wheels are typically painted in orange color for easy identification in the field. There are two types of car seals:

- GREEN for Car Seal Opened (CSO).
- RED for Car Seal Closed (CSC).

7.18.39. The following is the application of car seals.

a. Valves on the inlet and outlet of operational pressure relief valve and rupture disc.

b. Valve on flare lines.

c. Suction valves, discharge valves, isolation valves of fire water pumps.

d. Fuel tank of diesel engine fire water pump shutoff valve.

e. Individual fire water monitors, valves, post indicator valves and deluge system isolation valves.

f. Block valves of emergency eyewash and shower piping.

7.18.40. Crane operation activity should be supervised by experienced, trained and authorized Crane Rigger against approved Permit to Work.

7.18.41. Crane lifts shall not be allowed at wind speeds above 32 km/h (20 mph-17.4/ knots-9 meters/second).

7.18.42. Crane Lift Plan should be prepared by experienced, trained and authorized Crane Rigger.

7.18.43. When heavy equipment, including cranes, aerial devices, mobile elevated aerial platforms, man-baskets, man-lifts, or bucket-mounted vehicles, is operating near live electrical circuits/energized power lines, shall maintain minimum clearance distances from these live electrical circuits/energized power lines, as mentioned in the table below. Only qualified and trained personnel shall be allowed to operate and work on equipment in close proximity to live electrical circuits/energized

power-lines while wearing the necessary personal protective equipment (PPE). Insulated or uninsulated heavy equipment or construction machinery such as a forklift, excavator, bulldozer, wheel loader, backhoe, grader, crane, dump truck, man-baskets, man lifts, bucket mounted vehicles, etc. must be protected by providing grounding and bonding connections to dissipate any potential electrical charges when working in an electrically conductive, near live line or when protection is required against potential energization of the line or monopole/tower/structure or back-feeding from consumer double supply lines, generators, UPS systems, stored charges from capacitors, lightning strikes, or induced voltage from conductors/ cables/ transformers. Insulated heavy equipment, including those with rubber tires and wooden supports, is not foolproof. Over time, insulation may deteriorate or get damaged due to environmental exposure, wear, or physical damage. Even with insulation, there's still a risk of electrical charge to pass through, or heavy equipment large metal objects can accumulate induced voltages, especially under high voltage conditions. A person touching heavy equipment (touch potential) or standing near heavy equipment while touching the ground (step potential) could be electrocuted. Grounding and bonding provide an additional layer of protection to safely dissipate any electrical charge that might be transferred to the heavy equipment protecting both the equipment and nearby personnel from various electrical risks.

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7.18.44. A designated supervisor and signal-man shall ensure the following minimum safe distances shall be maintained all the time to prevent electrocution, equipment damage, and fires.

No.	Voltage AC	Minimum Safe Distance for Uninsulated Heavy Equipment	Minimum Approach Distance for Insulated Heavy Equipment
1.	400 Volts and below	3 Meters (10 Feet)	18 Inches
2.	11 kV	3 Meters (10 Feet)	4 Feet
3.	33 kV	4.3 Meters (14.2 Feet)	5 Feet
4.	66 kV	5 Meters (16.4 Feet)	6 Feet
5.	132 kV	6.9 Meters (22.8 Feet)	8 Feet
6.	220 kV	8.5 Meters (28 Feet)	12 Feet
7.	500 kV	12.2 Meters (40 Feet)	25 Feet

Note-1: Distances listed are for standard conditions, extra care must be taken, if standard conditions do not exist.

Note-2: When operating insulated heavy equipment near live electrical circuits/energized power lines, avoid using uninsulated lifting accessories, such as slings, hooks, or rigging equipment's. Choose non-conductive lifting accessories made of materials that do not conduct electricity.

7.18.45. Use non-conductive insulated measuring stick to verify clearance distances.

7.18.46. All lifting equipment shall have a certified safe working load (SWL) and be inspected prior to the lift. The SWL shall not be exceeded during the lifting operations and equipment that is damaged shall not be used.

7.18.47. The crane operator shall hold a valid government license/Heavy Transport Vehicle (HTV) license, appropriate for the type and size of the heavy equipment and shall be certified and trained for the equipment he/she operate.

7.18.48. Crane Rigger shall ensure that no one shall be under a suspended load.

7.18.49. All electrical equipment and portable lighting including flashlights shall be inspected.

7.18.50. A weatherproof Ground Fault Circuit Interrupter (GFCI) receptacle outlet shall be installed in wet and damp areas to prevent electrical shocks such as outdoors, kitchens, bathrooms, laundries, and sink areas where receptacles are placed or installed within 1.8 meters (6 feet). A weatherproof GFCI receptacle outlet shall be used at construction sites or while using portable electrical tools unless the voltage is 12 volts or less.

7.18.51. The confined space shall be provided with illumination of not less than 50 lux. The contractor can increase numbers of lights to get enough lux level. Where flammable or potentially explosive atmospheres are likely, extra low voltage lighting (typically less than 25 Volt) shall be used.

7.18.52. Visitor access should be controlled.

7.18.53. Day and Night shifts representatives shall ensure proper hand over, information of all on-going critical activities/ issues in writing and verbally to avoid any confusion.

7.18.54. Permit to Work system shall be followed for all activities.

7.18.55. Barricading and warning signs shall be provided, when required.

7.18.56. Fire protection system shall be provided, inspected and maintained.

7.18.57. Full body safety harness with front work positioning belt along with double lanyard for 100% tie shall be used at height more than 6 feet/1.8 meter above the ground when climbing poles, towers and structures including working through mobile elevated aerial platform, man-baskets, man-lift or bucket mounted vehicles. Full body safety harness with front work positioning belt along with double lanyard is to allow an employee to be supported on an elevated vertical surface such as a wall or pole and to work with both hands free. The use of a lineman body belt (positioning belt) for fall arrest or a full body safety harness with a single lanyard is strictly prohibited. When working in explosive or electrically conductive environments, use a Full Body Harness with PVC coated hardware or made from non-conductive materials like synthetic fibers or specialized fabrics with anti-static properties to minimize the risk of static discharge. Anchor the safety harness lanyard on rigged anchorage point at height, having fall clearance safety factor three (03) feet from impact level or ground level.

7.18.58. Use self-retractable lifelines (SRL) when working in elevated areas such as roof top.

7.18.59. PPE shall be in good condition. PPE should be inspected before use. Remove and dispose defective PPE from the job site.

7.18.60. Employee/ contractor should be familiar with the nearest manual call point (MCP), safety shower, fire extinguisher, nearest safe escape route and assembly point.

7.18.61. Employee/Contractor shall be familiar/ trained in incident reporting.

7.18.62. Housekeeping shall be conducted regularly.

7.18.63. HSE observations, unsafe conditions/ acts and violations shall be recorded and corrected immediately and necessary action shall be implemented for preventive action to avoid reoccurrence.

7.18.64. Hazardous observations/points shall be corrected/removed within twenty-four (24) hour timeframe. Until the hazardous observations/points is rectified or removed, deploy flagmen for traffic diversion and control. Apply barricades and warning signs around the hazardous area as well as blinking warning lights should be used during night time.

7.18.65. The network owner must ensure that their staff members, private electricians, and cable operators do not perform any unauthorized or illegal work on the distribution

network.

7.18.66. Network owner shall prohibit the installation of telecommunication, internet or television cable on its network. However, if such installations are permitted, the network owner must take full responsibility for its network's integrity and ensure public and animals safety.

7.18.67. The network owner Line Superintendent/Supervisor and Linemen/Electrician shall immediately fix hazardous unsafe condition, clearances, sagging, and deteriorated systems at the site upon discovery during attending complaints, repairs, conducting patrols, inspections, or preventive maintenance. The repair work shall be done under PTW.

7.19. Asset Integrity Management

7.19.1. The company shall establish, implement and maintain Asset Integrity Management program for new and existing infrastructure, plants, equipment and apparatus for in-service inspection and quality control applied during the construction and maintenance activities to ensure equipment, instruments, devices, and systems remain in good physical condition and to avoid degradation due to mechanically, chemically, biologically, excessive vibration or corrosion.

7.19.2. Inspection and maintenance frequencies shall be according to manufacturer's maintenance manual, such as daily, weekly, monthly, quarterly, biannually, annually, or as specified.

7.19.3. The company shall develop and maintain preventive maintenance SOP in line with the manufacturer's manual/recommendations for rehabilitation of its network/system to cover all operational equipment's, in-service inspections, effective maintenance, and the replacement of obsolete equipment, transformers, relays, structures, poles, and conductors to prevent injuries and fatalities among workers, the public and animals, and to minimize service disruptions.

7.19.4. The network owner shall conduct scheduled annual patrolling, inspections, testing, rehabilitation, repairs, replacement and upgradation work of the infrastructure within the sub-division including overhead lines that crossing roads, canals, or railways. These patrolling, inspections, and testing are essential to verify the integrity, assess overall condition, detect potential signs of structural failure, identify any issues such as cracks, deformation, deterioration, deflection, damage, defects, corrosion or rust, and confirm compliance with minimum clearance

requirements, among other factors. Check shackle insulators, jumpers insulated leads, parallel groove clamps (PG clamps) and pin insulators, conduct sag tightening, correction of tilted pole/structure, stay tightening, tree trimming on HT/LT lines. Check transformer insulated leads and its appropriate spacing, bush tightening, load balancing, air break (AB) switch, and that cutouts/dropouts fuses are of correct standard size and rating.

7.19.5. The network owner is responsible to remove unauthorized electrical infrastructure/network/conductors from its service territory.

7.19.6. The company shall ensure that all purchasing requirements are met and a quality assurance program is in place in order to prevent issues caused by poor quality material. The Line Management, Resident Engineer, Executive Engineer, Sub-Divisional Officer, Line Superintendents, or Linemen must inform procurement or purchasing personnel when poor quality material is discovered at the workplace. Proper feedback is critical to ensure that inferior quality materials do not cause accidents.

7.19.7. Operational equipment's/ devices in-service inspection and quality control shall address scope, minimum requirements, types and intervals, essential for equipment, instruments, devices, and systems whose deterioration and failure may adversely affect overall efficiency, and to assure safety, reliability and integrity of the system with reliable and efficient safe operation.

7.19.8. Inspection and quality control parameters shall be implemented according to manufacturer's maintenance manual for dam including but not limited to pore pressure, uplift pressure, seepage/leakage, land movement, stress/strain, headwater/tailrace, spillway, cutoff wall, tunnel, cofferdam, intake, surge shaft, gate shaft, power house, transformer hall, switchyard, busbar area, workshop, store/warehouse, camp, and connected roads, etc.

7.19.9. The Preventive Maintenance Plans should be scheduled based on operational equipment's/ devices inspection outcomes for each critical system/ equipment to increase their availability by reducing downtime caused by failure.

7.19.10. Safety critical protection devices, instrumentation, interlocks, protection relays, breakers, controls, safety relief valves, F&G detection system, software and components that are the last lines of defense and whose failure will result in a significant incident shall be reviewed to identify and establish a list. A Management of Change (MOC) Committee/ team shall be established to review and approve any

change, modification, addition or deletion of safety critical protection devices, instrumentation, interlocks, protection relays, breakers, controls, software, components and its list.

7.19.11. A document shall be developed that specifies the suitable procedures, testing of equipment, frequency of testing, acceptable limits and passing criteria of the tests of safety critical protection devices, instrumentation, interlocks, protection relays, breakers, controls, software and components. Ensure there are no defects, verify trip settings and configurations, and confirm that they are not bypassed, isolated, or deactivated.

7.19.12. The company shall develop, implement, and maintain Standard Operating Procedure (SOP) to ensure proper authorization and clear precautions before interrupting, bypassing, isolating, or taking out of service any critical device. This includes safety-critical protection devices, safety instrumented systems (SIS), interlocks, protection relays, breakers, controls, Emergency Shutdown Systems (ESD), Fire and Gas Detection Systems, Vibration Monitoring Systems (VMS), Compressor Protection Systems (CCS), software, and components. The authorization shall only be undertaken for specified reasons such as maintenance work, planned tests/inspections, or plant start-up activities, and must have formal documented approval for the minimum possible time, and the work on these components must continue uninterrupted until the system is back as normal online. In the absence of specific SOP, the Management of Change (MOC) shall be applied for temporary changes and interruptions.

7.19.13. Critical devices and Safety Instrumented Systems (SIS) interlocks shall not be bypassed, isolated, or taken out of service if the plant is not in a stable or normal operating condition, or if sufficient safeguards are not in place.

7.19.14. The Operator Override Switch (OOS) is designed to bypass any trip initiators within the plant's emergency shutdown logic during start-up. The OOS can be applied when the unit is off or as a required step in the SOP while the unit is in operation. The OOS is configured with a set timer and is designed to automatically remove the bypass condition after the set time expires or a specific condition is met.

7.19.15. The Maintenance Override Switch (MOS) is designed to bypass any trip initiators within the plant's emergency shutdown logic while the plant is in normal operating conditions. Therefore, the MOS shall not be applied for operational purposes, including but not limited to:

a. Plant start-up

b. Plant load reduction due to raw material shortage or any other reason

c. Any reason other than maintenance activities

7.19.16. The MOS for Safety Instrumented Systems (SIS) is intended to be used for maintenance tasks without affecting plant performance and parameters under the following circumstances:

a. Executing zero calibration for the SIS

b. Addressing any leak in the line connected to the SIS

c. During SIS malfunction

d. Replacing spares in the SIS, configured with a "1oo2" (The system can continue to operate safely if one of the two components is out of service) or "2oo3" (The system can continue to operate safely if one of the three components is out of service) voting logic.

e. Performing routine preventive maintenance (PM) on the SIS

7.19.17. Vibration Monitoring Systems (VMS) and Compressor Protection Systems (CCS) are designed to trip critical plant equipment to protect pumps or compressors from operating outside their designed limits. If it becomes necessary to bypass any of the transmitters for maintenance or upgrade purposes, the same criteria as those for the Maintenance Override Switch (MOS) shall be applied.

7.19.18. Firefighting and gas detection systems shall not be bypassed, isolated, or taken out of service unless there are alternative protection or countermeasures in place to address any potential fire or gas leaks in the affected area.

7.19.19. For the maintenance of Fire & Gas Detection systems, some online repairs are possible, such as replacing or calibrating toxic detectors or performing minor repairs without bypassing or isolating the main system. In cases where physical isolation is mandatory, such as repairing firefighting fluid leaks, users must ensure full coverage for the area by using other firefighting systems, such as standby fire water trucks in the event of fire water leaks. Typical circumstances requiring such work authorization include:

a. Addressing any leaks in the firewater network

b. Malfunctioning of LEL or toxic detectors

c. Replacing defective firefighting elements due to aging

d. Performing routine preventive maintenance on any part of the Fire & Gas Detection system

e. Physically isolating portions of the firewater network to carry out maintenance work

7.19.20. The company shall perform structural integrity and stability inspections for civil and steel structures of plant platforms, warehouses, regular office buildings, blast-resistant buildings, as well as porta cabins, at intervals of 3 to 5 years by qualified internal or external structural engineers, architects, or government authorities responsible for enforcing building regulations or inspection agencies registered with Pakistan Standards and Quality Control Authority or Pakistan Engineering Council to ensure that the building remains structurally sound so as not to pose a safety hazard to occupants and/or the public.

7.19.21. The civil and steel structure integrity and stability inspection shall address the foundation, beams, columns, walls, roof, bolted connection, welded joints, gratings/clips, handrails, ladders, ladder cages, bracings, toe boards, roof deflection, beam deformation, truss twisting, column buckling, welding, or any structural defects including suspended fire water system, pipe support and hanger to find out potential signs of structure failure if present such as cracks, water infiltration, deformation, deterioration or deflection and corrosion/rust, etc. If necessary, assess the load-bearing capacity and conduct non-destructive testing to detect any hidden defects. The company shall address all inspection findings accordingly.

7.19.22. The company shall conduct electrical inspections of plant, warehouses, normal office buildings and blast resistant buildings every 3 to 5 years by licensed and qualified internal electrical inspectors, or government authorities responsible for enforcing electrical inspections or inspection agencies registered with Pakistan Standards and Quality Control Authority to prevent electrical hazards and protect lives and property. The inspector will assess the wiring, electrical panels, grounding systems, appliances, and overall electrical setup. They will look for any standard violations, improper wiring, overloaded circuits, outdated equipment, or potential safety risks.

7.19.23. Equipment/Vessel Box-Up Guidelines before Plant Start-Up.

a. When an equipment or vessel is opened for corrective or preventive maintenance, thoroughly check and inspect equipment/vessel before boxing-up for the quality of maintenance work, misalignment, loose objects/parts, or potential rubbing parts in order to ensure the equipment/vessel is ready and safe for box-up.

b. Make sure all necessary repairs/modifications are completed as per the job card/scope.

c. Make sure that the correct type of gaskets are being used as per gasket specification.

d. Make sure that relief valves, instrumentation, grounding, and internal components are installed as per original configuration.

e. Make sure that bolted joints are tight and torque requirements are met.

f. Make sure that the non-return valve is installed in the correct direction.

g. Make sure that temporary connections installed for turnaround works/maintenance such as, power cables, pressure testing hoses, temporary lights, tools, packing material and scaffoldings are removed.

h. Make sure that platform gratings, handrails, toe boards, stairways, and ladders around the equipment/vessel are in good condition and safe to use.

i. Make sure that the equipment/vessel is clear and acceptable for operation.

j. On-site technical inspector, engineering team, or asset integrity team shall inspect the equipment/vessel to confirm the quality of the maintenance activity to ensure equipment, instruments, devices, and systems remain in good physical condition and to avoid degradation due to mechanically, chemically, biologically, excessive vibration or corrosion. Photographs of the components, their positioning, and the final closure should be captured alongside the maintenance crew for record and history purposes.

k. Make sure the possibility of the presence of a human being inside the equipment/vessel by verifying confined space entry log sheet and loudly shouting or blowing an air horn.

l. Sign-off the box-up checklist and begin boxing up equipment/vessel with strict site supervision.

m. In case of failure or encountering unusual findings during normal start-up, it is more prudent to perform an in-depth investigation to find the underlying causes through appropriate fault diagnosis and troubleshooting rather than rushing towards an immediate start-up.

7.20. Management of Change

7.20.1. The company shall establish, implement and maintain a Management of Change (MOC) program to manage and control the permanent or temporary changes "Not In Kind" in plant or facility during design, construction, operation and maintenance effectively through an established system.

7.20.2. MOC Committee/ team/ competent authority shall review and approve any change, modification, addition or deletion.

7.20.3. MOC program shall ensure that any change "Not In Kind" shall have safeguards in place to eliminate the possibility of hazards introduction as a result of changes to design, technology, operations, personnel, utilities, parameters, trips, set points, chemicals and plant equipment.

7.20.4. Lists of MOCs shall be maintained till plant life cycle for awareness of changes and their implications.

7.21. Traffic Management

7.21.1. Traffic Management Plan involves the safe access and movement of all vehicles (such as Cars, Pickups, Trucks, Tankers, Coaster and Buses), heavy equipment (such as Forklifts, Cranes, and Excavators) and Pedestrians within, through and around sites where work is carried out.

7.21.2. The company shall establish, implement and maintain Traffic Management Plan for vehicles operating within premises and outside, address authorized driver requirements, their defensive driving training, usage of company vehicles, safe routes including rest times and locations and implement a monitoring system that includes an incentive program for safe driving and a penalty and disciplinary actions for unsafe driving.

7.21.3. The company should employ only experienced, trained and authorized employees/ contractors as drivers of motor vehicles. Company drivers shall have government driving license for the type of vehicles they are driving. All drivers are expected to drive in a defensive manner and maintain control of their vehicles at all times. All

drivers must follow the posted speed limits and traffic signs. The driver shall wear seat belts at all times. Vehicles must be in good condition.

7.21.4. The driver is responsible for transporting materials properly and ensuring that the load does not exceed the manufacturer's design load capacity. All loads shall be properly secured and tied down. Materials should not extend beyond the vehicle's sides, front, or rear. Loads extending beyond the front or rear shall be marked with a red flag.

7.21.5. Driver shall perform a 360 degree walk-around before getting into the vehicle or before reversing to check any obstruction, kids or manhole etc. at front or rear side.

7.21.6. Driver shall inspect the vehicle's safety equipment (e.g., spare tires, toolkit, safety cone and fire extinguisher) before using the vehicle.

7.21.7. Driver shall maintain vehicle in a safe condition and maintain tire pressure as per the manufacturer's specifications.

7.21.8. All vehicles shall be parked correctly and/or in designated parking areas. Parked vehicles shall not obstruct other vehicles, roadways, access-ways or fire equipment.

7.21.9. No one shall sit or rest under parked vehicles.

7.21.10. Driver shall report unsafe condition or motor vehicle accident, no matter how slight, immediately to his/her supervisor/ in-charge.

7.21.11. The company "Traffic Management Plan" should also address following:

a. Pedestrian Routes,

b. Traffic Routes,

c. Traffic Movement,

d. Bicycle/ Tricycle Movement,

e. Interaction or potential interaction between pedestrians and vehicles,

f. Parking requirements,

g. Bus arrivals or departures,

h. Vehicles reversing and maneuvering,

i. Maintenance activities and movements,

j. Loading/ Unloading,

k. Traffic existing control and the type of additional controls required,

l. Site requirements for special vehicles such as crane (over-dimensional vehicles),

m. Hitching or unhitching of Trailers/ Tankers,

n. Mounting or dismounting of refuse container from vehicles,

o. Safe access to site Fire & Safety Equipment,

p. Maximum driving hours and rest time,

q. Safest routes for the journey outside the facility,

r. Emergency reporting and support services access.

7.21.12. In case of transporting bulky, oversized, overweight or special large loads, objects or materials, consider the following safety precautions:

a. Plan the transportation route in advance with local authorities and traffic police, considering the size, weight, and dimensions of the objects/materials.

b. Verify that the chosen route can accommodate the load without obstructions or structural limitations.

c. Coordinate with local authorities and traffic police for traffic management, including road closures, detours, or lane restrictions as needed.

d. Ensure that all necessary permits and approvals for oversized or overweight loads are obtained from relevant authorities including the traffic police.

e. Ensure that all personnel involved in the transportation process are trained in safety procedures and emergency protocols.

f. Develop and communicate an emergency response plan that includes procedures for handling accidents, breakdowns, or other unforeseen incidents during transportation.

g. Deploy escort vehicles, especially for exceptionally large or heavy loads, to provide additional warning to other vehicles and assist with traffic control.

h. Assign a responsible individual or team to oversee the transportation process and ensure that safety measures are followed.

i. Maintain/carry records of safety inspections, permits, and approvals related to the transportation.

j. Monitor weather conditions and postpone transportation if adverse weather, such as high winds, fog, smog or heavy rain, poses a safety risk.

k. Establish clear communication between the driver and any escort vehicles or personnel involved in the transport. Use two-way radios or other communication devices as necessary.

l. Properly secure the objects/materials on the transport vehicle using appropriate restraints, tie-downs, and securing devices.

m. Use cushioning and protective materials to prevent damage during transit.

n. Conduct a thorough in-service inspection of the transport vehicle, including tires, brakes, lights, and suspension, to ensure it is in good working condition and fit for the said load.

o. Ensure that the load is evenly distributed to prevent overloading one side of the vehicle, which can lead to vehicle instability. Center the load on the trailer to maintain balance.

p. Display oversized load signs, flags, and warning lights to alert other drivers on the road.

q. Continuously monitor the load and the transport vehicle during transit to identify and address any safety concerns promptly.

7.22. Task Risk Assessment/ Job Safety Analysis

7.22.1. A job plan or method statement shall be developed, agreed by site In-charge, permit to work issuer and receiver by considering to identify all known hazards, eliminates the hazards where practical, controls the hazards that cannot be eliminated, protects against injury if a hazard gets out of control, minimizes the severity of an injury if one takes place and identifies each worker's responsibilities.

7.22.2. The company shall apply Task Risk Assessment (TRA)/ Job Safety Analysis (JSA) or Job Hazard Analysis (JHA) as per job plan or method statement to all activities that are not covered by a standard operating procedure such as projects, modifications, repairs & maintenance, testing, inspection and turnaround in the existing operational facilities. The TRA/JSA is a systematic approach to identify and analyze potential hazards in performing a specific maintenance job/ work activity to eliminate or reduce these hazards and the risk of a workplace injury or illness.

7.22.3. Typical examples of the jobs requiring TRA/JSA are:

- Confined Space Entry
- Cutting or Welding
- High risk activities involving crane lifts such as use of crane suspended man baskets, tandem lifts, night-time lifts, limited access situations, near overhead power lines, etc.
- High risk material handling such as heavy product containers.
- Activities on pressure vessels, piping, or equipment that could not be depressurized.
- Activities involving use of new and/or potentially hazardous equipment, such as grit blasting, chemical cleaning, and high-pressure hydro-jetting.
- Activities where a person is required to use any fall arrest system, safety harness/ safety net.
- Activities involving multi-disciplinary groups on the same apparatus/ equipment or location.
- Simultaneous project works in the plants.
- Work involving electrical equipment and testing activities (repair, maintenance, troubleshooting or testing on electrical circuits, components, or systems, switching devices such as circuit breakers etc.).

7.22.4. TRA/JSA shall be conducted for:

- Tasks where the hazards and control measures need to be formally assessed.
- Tasks that have the potential for a serious incident.
- Tasks that have a history of incidents or near misses.
- Tasks that are not covered by a standard operating procedure or work instruction.
- Non-Routine Tasks or tasks that are being carried out in unusual or new circumstances.
- Tasks that are relatively complex.

7.23. Personal Protective Equipment

7.23.1. Personal Protective Equipment (PPE) shall be in accordance to hazard/risk category

and/or PPE need assessment study to provide protection from hazardous unsafe conditions.

7.23.2. Personal Protective Equipment (PPE) and Tools & Plants (T&P) shall meet the relevant local standards/specifications requirements. If local standards or specifications are not available, PPE shall comply with the most recent version of ANSI, ASTM, IEEE, IEC, NFPA or an equivalent engineering standard or specification. If any part of the local standards or specifications conflicts with ANSI, ASTM, IEEE, IEC, NFPA standards, or only partially defines the criteria or specification, company should follow the International Industry standard with a proper justification.

7.23.3. Maintain list of approved stock and non-stock safety items including PPE with material description and model number.

7.23.4. Maintain adequate approved stock of PPE inventory at each site.

7.23.5. Identify task specific PPE in Task Risk Assessment/ JSA/ Permit to Work.

7.23.6. Workers should be trained in the adequate use of these PPE.

7.23.7. Each staff member is responsible for inspecting his/her PPE before each use. They should promptly notify their Line Superintendent/Supervisor if the PPE is lost, defective, damaged, or in need of replacement due to normal wear and tear. Any PPE requiring replacement should be presented to the Line Superintendent/Supervisor. Any expired, defective, or damaged PPE shall be promptly removed from service and disposed of correctly.

7.23.8. PPE shall be stored and maintained in a safe working condition after completion of work.

7.23.9. Individual PPE, is issued to individuals and their care is the responsibility of the individual.

7.23.10. Individual PPE should be issued only to technical staff working in the field and should not be issued to individuals working in an office-based setup, irrespective of his/her service cadre. If an office-based individual needs to visit a construction, operation, or maintenance site, they may use PPE from the common pool.

7.23.11. In the first month of fiscal year, the following individual PPE shall be issued in accordance with the issuance frequency.

7.23.11.1. A minimum of one pair of non-conductive safety shoes shall be issued annually.

7.23.11.2. A minimum of two pairs of arc rated and/or flame-resistant uniforms with a minimum value of 4 cal/cm² (Category-1), including one winter jacket, shall be issued annually.

7.23.11.3. A minimum of one non-conductive safety helmet with chin strap shall be issued every five (5) years. Material should be fully dielectric, no metal parts, non-vented, helmet material polyethylene/ polycarbonate, other plastic materials stabilized against degradation from ultraviolet radiation, 6 or 4 point suspension, adjustable type, helmet intended to reduce the danger of exposure to high voltage electrical conductors. Head Protection shall be used with strap when working at height above 1.8 meter/confined space.

7.23.11.4. Non-conductive safety glasses shall be issued on an as-needed basis.

7.23.11.5. Particulate masks shall be issued on an as-needed basis.

7.23.11.6. Ear muff/plugs shall be issued on an as-needed basis.

7.23.12. Common Pool PPE shall be managed by each sub-division/section. Common Pool PPE shall be issued on a temporary basis and shall be returned to the store or designated location upon job completion. PPE cleaning is the user's responsibility.

7.23.13. Common Pool PPE/ safety items should include one or more of the following:

a. Safety boots, or overshoes for wet service.

b. Static dissipative footwear, wherever applicable for potential dust zones or flammable substances to reduce dust risk.

c. Contact or non-contact voltage tester, detector or beeper for the rated voltage.

d. Personal or Proximity Voltage Detector (with voltage ranges from 120VAC to 500kV) while working to detect induced voltage from adjacent conductors, cables or transformer, particularly if the earthing clamp is loose or not electrically connected.

e. When performing tasks on energized or live electrical lines or equipment with voltages up to 36 kV AC / 54 kV DC, utilize insulated Electrical Rubber Hand Gloves and Sleeves designed for the specific voltage class required. The appropriate classes are as follows:

   – Class 00 for LT (Maximum 500 Volts AC / 750 Volts DC)

- Class 0 for LT (Maximum 1 kV AC / 1.5 kV DC)
- Class 1 for LT (Maximum 7.5 kV AC / 11.250 kV DC)
- Class 2 for HT (Maximum 17 kV AC / 25.5 kV DC)
- Class 3 for HT (Maximum 26.5 kV AC / 39.75 kV DC)
- Class 4 for HT (Maximum 36 kV AC / 54 kV DC)

f. Specific LT or HT Leather gloves shall be worn over insulated rubber gloves to provide the required mechanical protection. The gloves shall not be used when damp.

g. Dielectric hand gloves and sleeves made of natural latex rubber, with a thickness ranging from 0.5 to 2.9 mm, offer protection against voltages up to 36,000 volts.

h. The date of the dielectric electrical test made at the end of production is placed on every hand gloves and sleeves bag, as well as a lot number to ensure product traceability. Gloves and sleeves should be inspected for any visible damage or after any action that may have caused damage. Hand gloves that are used frequently should be tested at intervals not exceeding 6 month and sleeves should be tested at intervals not exceeding 12 months. Hand gloves that are used only occasionally should be tested after each use and, in any case, at intervals of not more than 12 months. Hand gloves and sleeves held in stock should be re-tested at intervals not exceeding 12 months.

i. Flame Resistance Clothing (FRC) uniform to resist ignition, minimize heat transfer, and provide protection against flames, heat, and thermal hazards. Uniform should be breathable clothing with Reflective Visibility strips. Avoid non-breathing synthetic clothing's. Uniforms should be close-fitting to minimize the risk of loose clothing getting entangled in machinery.

j. Conductive PPE for live line/circuit such as conductive shoes, conductive socks, conductive gloves, conductive trousers, and conductive shirts for involved working voltage. It is not recommended to use foot powder with protective conductive footwear since foot powder provides insulation and reduces their conductivity.

k. Use hand-line to raise or lower tools and materials at height.

l. Use drop toolkits to prevent tools from falling to the ground from a height.

m. Arc Flash Kit for Arc Flash Protection such as Category-4 Arc Flash Resistant

Suite, Arc Flash Hood Arc-rated Gloves and Arc-rated Fall Protection while working on high voltages (more than 420 V). The Arc Flash Kit Category-4 provides maximum protection for workers performing tasks such as:

- Operating or maintaining high-voltage switchgear and control panels.
- Conducting live electrical work or troubleshooting on high-energy systems.
- Installing or upgrading electrical infrastructure where arc flash hazards are present.
- Performing electrical testing and diagnostics on high-voltage equipment.

n. Step & Touch Testing Kit.

o. Eye protection with non-conductive frames.

p. Full Face Shield (polycarbonate or similar non-melting type) while working in batteries/ handling chemicals.

q. Hearing Protection (Noise more than 85dBA).

r. Full body safety harness with front work positioning belt (positioning lanyard) along with double lanyard for 100% tie shall be used at height more than 6 feet/1.8 meter above the ground when climbing poles, towers and structures including working through mobile elevated aerial platform, man-baskets, man-lift or bucket mounted vehicles. Full body safety harness with front work positioning belt along with double lanyard is to allow an employee to be supported on an elevated vertical surface such as a wall or pole and to work with both hands free. The use of a lineman body belt (positioning belt) for fall arrest or a full body safety harness with a single lanyard is strictly prohibited. When working in explosive or electrically conductive environments, use a Full Body Harness with PVC coated hardware or made from non-conductive materials like synthetic fibers or specialized fabrics with anti-static properties to minimize the risk of static discharge. Anchor the safety harness lanyard on a rigged anchorage point at height, having fall clearance safety factor two (02) feet from impact level or ground level. The replacement frequency for full body safety harness, positioning ropes, lanyards, and fall arresters shall be every five (5) years.

s. Suspension Trauma Strap especially for work at height for long hours, in case of emergency the worker can stand on his/her feet on it to prevent trauma till

he/she is rescued.

t. Use self-retractable lifelines (SRL) when working in elevated areas such as roof top.

u. Voltage-rated portable rubber insulated floor mats, insulated working supports or blankets, rubber/plastic plates, or any other non-conductive objects like plywood barriers that prevent accidental contact.

v. Insulated Hot Sticks for voltage measurement, operation of disconnection or cutouts/dropouts, and application of grounding/ earthing, etc.

w. Insulated electrical tools.

x. Other task specific PPE could be, hot stick, portable earthing/ grounding/ bonding and short set, earth resistance tester, megger tester, gum boot, air supplied helmet for chemical sprays or grit blasting, PVC Shoes, life line, portable gas detector, particulate masks, half or full face Respirator (cartridge masks as per MSDS, SCBA, supplied air breathing Apparatus), Bunker Gear, Ear Plugs/Muffs, Rain Coat, PVC Disposable Coverall, Rubber/PVC Apron, fire blanket, Face Shield, Safety Goggle, Welder's Shield, well-fitted gloves (Cut Resistance, Pinch Resistance, Heat Resistance, Cryogenic, Welder Gloves, Electrical Gloves, Chemical Gloves as per MSDS, Rubber or Plastic acid-resistant chemical gloves with elbow-length gauntlet), portable eye wash, Non-Sparking Tools, flame-proof light, explosion proof low voltage (24v) lighting, Aluminized suit for pyrophoric chemical handling, Long boots, Snake catcher Rod, Anti-Snake Repellent Powder, Warning Tapes/ Cones, Warning Sign, non-conductive measuring tape/ stick and ruler, Reflective Vest for worker visibility, Lifejacket, etc.

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7.23.14. Individuals using PPE, tools, equipment, or insulated cables may receive a fatal electric shock if the voltage exceeds the dielectric strength of the PPE, tools, equipment, or insulated cables. Thus, it's crucial to use non-conductive PPE, tools, plants, and earthing/ grounding/ bonding sets according to the rated voltage.

7.23.15. Don't wear gloves/loose clothes around moving machinery such as drill presses, mills, lathe, grinder, etc.

7.23.16. Long hair must be securely tied back or restrained to prevent it from getting caught in machinery or other moving parts. Avoid wearing jewelry, particularly rings, as they can become caught in moving machinery or equipment.

7.23.17. The company should establish clear instructions or add in relevant SOP that when and where these PPE should be used and communicate these effectively to all relevant workers on its facilities.

7.24. De-Energized Circuits and Apparatus

7.24.1. Only electrically experienced, trained and authorized employees/ contractors shall perform electrical work against approved Permit to Work.

7.24.2. Install and maintain fixed earthing/grounding system for all equipment's, exposed metallic structures/ poles, stay wires/braces and both H-Type and Spun Type concrete poles that contain a reinforced iron bars, having designated point for the connection of earthing/grounding. Poles are grounded or earthed for several important reasons related to electrical safety, system reliability, and protection against electrical faults. In the event of a fault, such as a short circuit, electrical current can flow through the pole and into the ground. Earthing of the pole provides a safe path for the fault current to dissipate into the earth, reducing the risk of electrical shock hazards to personnel and nearby structures. Poles can also serve as lightning rods, attracting lightning strikes during thunderstorms. Therefore, proper earthing of the pole helps dissipate the electrical energy from lightning strikes safely into the ground, reducing the risk of damage to the pole and associated equipment, as well as the risk of fire. Earthing of the pole stabilizes the electrical potential of the pole and the surrounding area. This can help prevent potential differences and voltage gradients that could lead to electrical arcing, equipment damage, or electrical interference in nearby facilities. In some cases, electrical systems may produce stray currents that can affect nearby structures, pipelines, or communication cables. Grounding the poles diverts these stray currents safely into the ground, preventing corrosion or interference with other systems.

7.24.3. Although Glass Fiber Reinforced Polymer (GFRP) poles are non-conductive, any conductive components mounted on the pole, such as transformers, metal cross arms, and lightning arrestors, should be properly grounded. This grounding provides a path to earth for lightning strikes and surges, protecting both the equipment and the surrounding area, and reducing the risk of electrical shocks and fires.

7.24.4. Fixed earthing/grounding resistance shall be as per design or manufacturer's instruction. In the absence of grounding instruction, the earthing resistance for

HT/LT structures/ poles shall be not more than 5 Ohms and Distribution transformer shall be not more than 2.5 Ohms to determine the integrity of the grounding path to ensure protection from shock hazards. The earthing resistance for Grid Station/ Substation/ switchyard equipment shall be not more than 2 Ohms.

7.24.5. Verify integrity of fixed earthing/ grounding by continuity test and resistance measurement. In general, this cycle can range from 6 months to 3 years, depending on conditions and criticality. Wet locations testing should be 12 months and critical care shall be 6 months. Provide name plate/ tag to all structures/ poles/ equipment's with numbers for tracking of earthing/ grounding testing record, etc. Original record of testing with structures/ poles/ equipment's numbers shall be retained and preserved by the company for three (03) years.

7.24.6. Before working on circuits and apparatus, identify task specific PPE in Permit to Work.

7.24.7. Dry insulated stick/ rod, tools and PPE shall be used for applying and removing the earthing connection to lines or equipment.

7.24.8. Follow safety procedure/SOP with required PPE to ensure safe execution of the job when it is confirmed that there is no induced voltage exists at the maintenance worksite or where workers work at an electrically safe distance outside the boundary of induced voltage.

7.24.9. Workers shall maintain an appropriate minimum working safe distance from uninsulated live conductors/ energized apparatus at all times with required PPE to obtain the safest work environment and adequately to protect against electrical shock or burns.

No.	Voltage AC	General Public	Electrical Worker with Required Electrical PPE	Specialized Electrical Worker with Required Electrical PPE
1.	400 Volts and below	3 Meters (10 Feet)	1 Meters (3.5 Feet)	0.3 Meter (1 Feet)
2.	11 kV	3 Meters (10 Feet)	1.5 Meters (5 Feet)	0.7 Meter (2.2 Feet)
3.	33 kV	3 Meters (10 Feet)	1.8 Meters (6 Feet)	0.8 Meter (2.9 Feet)
4.	66 kV	3 Meters (10 Feet)	2.5 Meters (8 Feet)	1 Meter (3.5 Feet)
5.	132 kV	3.4 Meters (11 Feet)	3 Meters (10 Feet)	1.2 Meters (3.9 Feet)

6.	220 kV	4 Meters (13 Feet)	4 Meters (13 Feet)	1.7 Meters (5.6 Feet)
7.	500 kV	5.8 Meters (19 Feet)	5.8 Meters (19 Feet)	3.6 Meters (11.8 Feet)

Note-1: Distances listed are for standard conditions, extra care must be taken, if standard conditions do not exist.

Note-2: An Electrical Worker received general electrical training, performing routine tasks like basic maintenance, repairs, and installations. They understands basic electrical principles, hazards, and safety practices, and typically possess standard certifications or licenses for general electrical work. They handles common electrical systems in residential, commercial, and light industrial settings. These workers often works under the supervision of experienced or specialized electrical personnel for more complex tasks.

Note-3: A Specialized Electrical Worker receives advanced or specialized electrical training, enabling them to handle complex and high-risk electrical tasks. They possess in-depth knowledge of advanced electrical concepts and high voltage safety protocols. Holding advanced certifications, specialized licenses or specific training certifications in areas like high voltage systems, hazardous locations, or specialized industrial machinery. They can work independently on complex assignments, and handles specialized electrical systems in high-risk environments.

Note-4: A trained and authorized worker may "contact" live conductors/energized apparatus up to 33 kV using insulated electrical PPE. However, the worker must observe and maintain a minimum safe working distance between any uninsulated part of his/her body and the live conductors/energized apparatus. In cases where maintaining the minimum safe working distance is not feasible, the trained and authorized worker shall be insulated or guarded by portable voltage-rated portable rubber insulated floor mats, insulated working supports or blankets, rubber/plastic plates, or any other non-conductive objects like plywood barriers that prevent accidental contact.

7.24.10. Use non-conductive insulated measuring stick to verify clearance distances.

7.24.11. When it may not be possible to maintain the appropriate minimum distance, then the adjacent circuit or circuits must be de-energized, OFF isolated, locked, tagged, and grounded by opening circuit breakers, isolators and closing the earthing switch at all ends of the connected grids.

7.24.12. Whenever work is to be done on or near an uninsulated energized overhead circuit, it must be identified as a "hot zone" if it compromises the minimum safe approach distance. The hot zone is immediately dangerous to life or health (IDLH) due to an identified risk of electrical shock, or burns in presence of high induced voltage in the hot zone.

7.24.13. When working on de-energized overhead lines near existing energized high voltage lines in the hot zone, there is a risk of induced voltages due to the significant electromagnetic fields present around energized overhead lines that can deliver lethal electric shocks.

7.24.14. All of the below precautions are applicable when a new monopole/tower/structure is to be erected in hot zone along with an existing transmission line with in same corridor.

7.24.15. The job steps shall be listed in the Method Statement/SOP/Job Plan, reviewed and confirmed by all parties with precautions, and means of communication shall be available at ground level as well as at high elevation.

7.24.16. Conduct a risk assessment or analysis for electric shock and arc flash to evaluate and identify site-specific safety needs for electrical facilities, establish an arc flash protection boundary, and provide recommendations for the safe execution of the job. Arc-flash hazard warning and labeling shall be provided for electrical equipment's such as switchboards, panelboards, industrial control panels, and motor control centers. If no arc flash analysis is available, then the default arc flash protection boundary along with the appropriate PPE should be set at 1.2 meters (4 feet) for voltages ranging from over 420 V to 11 kV.

7.24.17. The associated risks near energized high voltage lines, and its appropriate protection must be effectively communicated to all involved parties.

7.24.18. When planning the task, the worker's position in relation to the exposed circuit such that planned movements of the worker's body or conductive tools, material or vegetation should not result in any encroachment upon these limits.

7.24.19. Power lines are made of metal, it expands and contracts when it is hot and cooled. The conductors may become hot from high ambient air temperatures and/or from excessive electrical load current passing through the conductors. Whatever the cause, any expansion will result in gravity causing the power lines to sag. Power lines can also swing from side to side due to wind. Due to this reason, hot zone limit must be increased either vertically or horizontally, depending on how much the conductor sags or swings.

7.24.20. There must be no simultaneous or overlapping of different jobs in hot zone.

7.24.21. Work shall not be performed in the following conditions at or near energized lines,

- At night time,
- In adverse weather, or rain
- A situation in which visibility is obscured.
- When wind speed above 32 km/hr. (20 mph, 17.4/knots, or 9 meters/second).
- Temperature above 45°C.
- Excessive outdoor humidity in direct sunlight (heat index more than 52°C)

  Heat index is calculated by using temperature and humidity together. There are four categories of heat index: Caution (26 to 32°C), Extreme Caution (33 to 39°C), Danger (40 to 51°C), and Extreme Danger (52°C or higher).

  Note: Night time work may be allowed only if the parallel circuit is de-energized and the above conditions are met, i.e. suitable weather, proper visibility, and wind speed below 32 km/h.

7.24.22. Only authorized, trained, experienced, and medically & physically fit employees/contractors shall enter in the hot zone with necessary level of personal protection (PPE) to perform specific maintenance task against approved "Permit to Work" under the continuous direction and supervision of the site job in-charge to monitor compliances with safe work procedures. Authorized employees/contractors shall have electrical knowledge and training to avoid electrical hazards associated with work on or near exposed energized live parts or conductor. Inexperience employee/contractor, trainee or apprentice can work under the direct supervision of authorized employees/contractors, to gain the necessary training and experience.

7.24.23. The site job in-charge shall be available at all times to resolve differences in the work practices and opinions in order to ensure effective coordination at the work site.

7.24.24. When working on de-energized overhead lines/circuit protected by automatic self-closing and activating interlocks, the automatic interlocks must be locked and tagged with normal locking and tagging (LOTO/Hold-Off) of the system before "Permit to Work" is issued, and they shall not be unlocked until the work is completed and "Permit to Work" is closed.

7.24.25. Ensure that all jobs are executed under safe and reliable condition and do not let any unauthorized worker/contractor/sub-contractor/daily wage employees to enter in the hot zone.

7.24.26. Identify and verify the exact location/correct circuit to be worked in the field by the site job in-charge before starting the job to avoid any contact with the energized line.

7.24.27. Co-workers should be informed when any employee change positions on poles/towers.

7.24.28. Suitable barriers shall be erected around the work area at ground level at minimum safe distance (safe zone) boundary from the monopole/tower/structure.

7.24.29. A staging area shall be established in the safe zone at upwind or crosswind direction, outside the barricaded area of hot zone for maintenance planning & operation, workers, their rest area and heavy equipment's parking.

7.24.30. In order to identify the safe zone boundary, warning tape and cones must be used at ground level when working near energized overhead power lines.

7.24.31. Employees shall not reach blindly into areas containing exposed electrical conductors or circuit parts where an electrical hazard exists.

7.24.32. When entering and working in hot zone, personal protective equipment must be worn.

7.24.33. A standby man shall be deployed in a safe zone who is trained and competent to perform his/her task. He must know emergency procedure and to control unauthorized visitors and vehicles into the restricted hot zone/barricaded area.

7.24.34. The standby man shall control and allow workers as per plan to enter the hot zone once the grounding system has been applied and all personal protective equipment has been worn.

7.24.35. A standby man shall have no other duties that could distract him from monitoring the work continuously.

7.24.36. In case of unsafe conditions, unsafe behavior of entrants, or any other situation that could endanger entrant's life, the standby man shall order them to evacuate the area.

7.24.37. Standby man shall remain at his/her post until relieved by a qualified replacement who is familiar with the job, or until all entrants have exited the hot zone. If he must leave the area and no other standby man is provided, all entrants must exit the hot zone.

7.24.38. Standby man shall request concerned supervisor for additional standby man, if required.

7.24.39. Wear high voltage insulated electrical rubber hand gloves and sleeves for the rated voltage for protection against potential energization of the line or monopole/tower/structure or back-feeding from consumer double supply lines, generators, UPS systems, stored charges from capacitors, lightning strikes, or induced voltage from conductors/ cables/ transformers.

7.24.40. Discard electrical rubber hand gloves from service whose shelf life is expired. Electrical gloves are made of natural rubber, which is derived from the latex of plants. Natural rubber has a shelf life of three (3) to five (5) years, depending on the weather and the usage conditions.

7.24.41. Conduct periodic inspection and dielectric testing of in-service insulated electrical rubber hand gloves. Rubber insulating gloves must be tested before first issue and every six months thereafter or when showing any signs of defects upon inspection. Write the date of next re-testing on the gloves pair with permanent marker. The "first issue" mean when the new gloves are removed from their original, manufacturer's packaging.

7.24.42. Insulating sleeves shall be worn with insulating gloves in case exposing the employee elbow and upper arm to contact with other energized parts for protection against potential energization of the line or monopole/tower/structure or back-feeding from consumer double supply lines, generators, UPS systems, stored charges from capacitors, lightning strikes, or induced voltage from conductors/ cables/ transformers.

7.24.43. Insulated Electrical Rubber Hand Gloves and Sleeves, Class 00 (Maximum AC 500V/DC 750V), 0 (Maximum AC 1000V/DC 1500V), 1 (Maximum AC 7500V/DC 11250V), 2 (Maximum AC 17000V/DC 25500V), 3 (Maximum AC 26500V/DC 39750V), 4 (Maximum AC 36000V/DC 54000V) for involved line or induced voltage. Leather gloves shall be worn over insulated rubber gloves to provide the required mechanical protection. The gloves shall not be used when damp.

7.24.44. Use a Full Body Harness along with double lanyard with PVC coated hardware or made from non-conductive materials like synthetic fibers or specialized fabrics with anti-static properties to minimize the risk of static discharge, when working in height in explosive, electrically conductive environments, live line or when protection is required against potential energization of the line or

monopole/tower/structure or back-feeding from consumer double supply lines, generators, UPS systems, stored charges from capacitors, lightning strikes, or induced voltage from conductors/ cables/ transformers.

7.24.45. Wear high voltage insulated electrical (dielectric) safety shoes (non-metallic and non-magnetic) with titanium or composite toe for the rated voltage instead of normal safety shoes (steel toe) to avoid step potential hazards when working in an electrically conductive, live line or when protection is required against potential energization of the line or monopole/tower/structure or back-feeding from consumer double supply lines, generators, UPS systems, stored charges from capacitors, lightning strikes, or induced voltage from conductors/ cables/ transformers.

7.24.46. Do not use muddy shoes when climbing up, there is a risk of slipping.

7.24.47. When protection against arc flash is required as per risk assessment/JSA then use arc flash kit while working on high voltage at energized/live line more than 420V.

7.24.48. Electrical rubber hand gloves and sleeves shall be stored in approved protective bags in a cool, and dry location out of the sun. The items shall not be directly placed on the ground, as they must be kept free of dirt and moisture.

7.24.49. When electrical rubber hand gloves and sleeves have been in service for a long time (such as overnight), it must not be expected to provide appropriate protection. Such items must be removed, inspected, and cleaned before being used again. If suspected, they must be sent for electrical tests.

7.24.50. Rubber gloves must not be worn inside out. They must not be worn without approved leather gloves. Leather gloves must never be used for any other purpose.

7.24.51. Use insulated tools, platforms and equipment. Insulated tools could be made of fiberglass-reinforced plastic or appropriate material when working in an electrically conductive, live line or when protection is required against potential energization of the line or monopole/tower/structure or back-feeding from consumer double supply lines, generators, UPS systems, stored charges from capacitors, lightning strikes, or induced voltage from conductors/ cables/ transformers.

7.24.52. Tools and telescopic hot stick must be approved and tested according to the rated voltage of the line. Test dates must be clearly marked and never exceeded.

7.24.53. In an electrically conductive/ live line, metal rulers, measuring tapes, or wire

reinforced fabric tapes must not be used.

7.24.54. To raise tools or materials for workers on monopole/tower/structure, an approved tool bag must be used. Tools must not be thrown to workers under any circumstances.

7.24.55. Under-rated tools or apparatus must not be used in the hot zone.

7.24.56. Use weatherproof Ground Fault Circuit Interrupters (GFCIs) in wet and damp areas to prevent electrical shocks at construction sites or while using portable electrical tools unless the voltage is 12 volts or less.

7.24.57. Employees/contractors must not touch tools or any conductive materials with bare hands in the presence of induced voltage in the area.

7.24.58. Drop toolkits shall be used to prevent tools from falling from a height. The standby man shall monitor and ensure that no one is underneath the worksite.

7.24.59. Each tool and piece of equipment must be inspected for mechanical and electrical strength and wiped clean before use.

7.24.60. All parties involved in working must understand the risks of falling/touching tools on nearby live circuits and shall take appropriate precautions.

7.24.61. Tools shall not be used on energized lines or near energized lines, or on energized equipment unless workers have been properly trained to use such tools.

7.24.62. Insulated or uninsulated heavy equipment or construction machinery such as a forklift, excavator, bulldozer, wheel loader, backhoe, grader, crane, dump truck, man-baskets, man lifts, bucket mounted vehicles, etc. must be protected by providing grounding and bonding connections to dissipate any potential electrical charges when working in an electrically conductive, near live line or when protection is required against potential energization of the line or monopole/tower/structure or back-feeding from consumer double supply lines, generators, UPS systems, stored charges from capacitors, lightning strikes, or induced voltage from conductors/ cables/ transformers. Insulated heavy equipment, including those with rubber tires and wooden supports, is not foolproof. Over time, insulation may deteriorate or get damaged due to environmental exposure, wear, or physical damage. Even with insulation, there's still a risk of electrical charge to pass through, or heavy equipment large metal objects can accumulate induced voltages, especially under high voltage conditions.

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A person touching heavy equipment (touch potential) or standing near heavy equipment while touching the ground (step potential) could be electrocuted. Grounding and bonding provide an additional layer of protection to safely dissipate any electrical charge that might be transferred to the heavy equipment protecting both the equipment and nearby personnel from various electrical risks.

7.24.63. All rubber protective equipment, tools, and equipment shall be thoroughly inspected before each use and whenever damage is suspected. If any tools or equipment show signs of damage, they must be taken out from service and disposed of immediately.

7.24.64. In an electrically conductive, live line, grid station, substation, switch yard or in presence of induced voltage, conductive items such as metallic coins, metal-framed glasses, jewelry, watches, watchbands, bracelets, rings, key chains, necklaces, metallic belt buckle, metal headgear, metalized aprons, or cloth stitched with conductive thread shall not be worn or carried.

7.24.65. Ropes, slings, taglines, hand-lines and other tackle shall be of non-conductive material/insulated used at or near energized lines and equipment, and must not be used for any other purpose. It must be kept clean, dry, and free of foreign substances.

7.24.66. Rope conducts electricity in an electrically conductive, live line or in presence of induced voltage when moist, which makes it extremely dangerous. If rope becomes damp, it must be uncoiled and allowed to dry for at least 48 hours.

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7.24.67. Crane Lift Plan shall be prepared by an experienced, trained and authorized Crane Rigger and crane operation activity shall be supervised by the Crane Rigger against an approved Permit to Work. Warning signs shall be posted on cranes and heavy equipment regarding the minimum clearance.

7.24.68. In the hot zone, only authorized operators shall enter and operate certified insulated heavy equipment's, cranes, and aerial devices.

7.24.69. When a boom or load is within 20 feet of an energized circuit, the heavy equipment's, cranes, man lift and aerial devices must be grounded.

7.24.70. Ground workers must stay away from cranes, heavy equipment, and aerial devices that have booms or buckets in the vicinity of lines, or apparatus that could be energized due to induced voltage.

7.24.71. The ground workers who are required to approach heavy equipment, cranes, or aerial devices must use insulated electrical (dielectric) overshoes because they could be subjected to step potential during a fault.

7.24.72. Ground workers must communicate effectively with those in the bucket to ensure that ground workers are clear when work is performed in the hot zone.

7.24.73. In the hot zone, employees/contractors shall not perform housekeeping near energized electrical conductors and circuit parts or where induced voltage can cause injury unless adequate safeguards are provided to prevent electrical shock.

7.24.74. In the hot zone, conductive cleaning products, such as steel wool, metalized cloth, and silicon carbide, as well as conductive liquid solutions shall not be used unless adequate safeguards are provided to prevent electrical shock.

7.24.75. The company shall implement and document a system to verify that all established requirements in this paragraph are met. If it is observed that deviations and/or violations are present, the company shall determine and implement adequate actions to prevent and rectify these deviations and/or violations.

7.25. Temporary Grounding and Bonding for De-energized Circuit/Lines

7.25.1. Electrical conductors which normally carry high voltage must not be touched unless they are rendered safe for work to be done on them.

7.25.2. The working circuit must be de-energized, OFF isolated, locked, tagged, and grounded by opening circuit breakers, isolators and closing the earthing switch at all ends of the connected grids.

7.25.3. When a circuit is isolated, live conductors/apparatus act as capacitors, storing electrical charge. Even after isolation, this stored energy may discharge when a worker touches the isolated conductors/apparatus, potentially causing an electric shock.

7.25.4. The temporary grounding or bonding will be placed at such locations so that each worker is protected from hazardous voltages. After this confirmation from the authorized personnel, the work can be performed.

7.25.5. The temporary grounding wires for 400 Volts and below, 11 kV and 33 kV lines, shall be connected to the temporary grounding rod inserted into the ground to a depth of at least 1 meter, and should be placed preferably 6 meters away from the point of work and, inside the barricaded area, where no one is present or able to touch it. In case of high voltage lines such as 66 kV, 110 kV, 132 kV, 220 kV, and 500 kV lines, the temporary grounding wires shall be connected to the transmission

structure grounding points.

7.25.6. Portable grounding leads, and clamps must be capable of conducting the maximum fault current possible at the work location for the duration needed to clear the fault.

7.25.7. De-energized lines and equipment must be treated as live in the absence of proper grounding.

7.25.8. The protective grounding system, which includes conductor ground and bonding leads, must be engineered to protect workers from hazardous voltages that can be created by line reenergizing, lightning strikes, or induced voltage.

7.25.9. If more than one crew is working independently on the same de-energized line or circuit, each crew must have single-point protective grounds installed to create an equipotential zone at each work location.

7.25.10. Isolate the line from all possible power sources in the electrical network and install portable temporary grounding/earthing on both sides of the work area as close as possible. Ground all conductors, including the neutral and stay wires, that may be approached and touched during the work.

7.25.11. Single-point grounding shall be applied because it generally yields the lowest potential difference in the work zone and because it usually requires less grounding equipment and effort to install. Single-point grounding involves installing one set of grounds at the work location between the conductors, the system neutral (if one exists), and the ground (which may be a tower or pole ground) to create a bonded work zone that will remain at a near identical state of electrical potential, hence the term "equipotential zone."

7.25.12. When applying single-point temporary grounding, first connect the ground clamp of grounding lead to monopole/tower/structure/stub, and then connect the contact clamp to isolated/de-energized line. While for removing temporary grounding, first remove the contact clamp from isolated/de-energized line and then remove the ground clamp from the monopole/tower/structure/stub.

7.25.13. Provide training to its employees and contractors on how to correctly install conductor grounds and bonding for the involved voltage rating to mitigate the electrical shocks.

7.25.14. Workers shall not start work on the de-energized lines until isolation, lockout, and tagout procedures have been completed, and a work permit has been issued. Use a contact or non-contact voltage tester, detector or beeper to confirm that the line is dead. Alternatively, worker shall carry a personal or proximity voltage detector (with voltage ranges from 120VAC to 500kV) all the time while working to detect

induced voltage from adjacent conductors or circuit, particularly if the earthing clamp is loose or not electrically connected.

7.25.15. Provide temporary earthing on both sides of the line, whether it is high tension (HT) line or low tension (LT) line, to safeguard against potential energization of the line or monopole/tower/structure or back-feeding from consumer double supply lines, generators, UPS systems, stored charges from capacitors, lightning strikes, or induced voltage from conductors/ cables/ transformers. When necessary, use rubber electrical gloves, rubber sleeves, and a full-body safety harness (PVC coated) with a positioning belt along with double lanyard for work at heights.

7.25.16. Grounding cables shall meet the requirements of the IEC 61230 Standard.

7.25.17. Hazardous induced voltage is present all the time around the de-energized line, monopole/tower/structure and at worker worksite even after installation of conductor grounds and bonding therefore the conductor grounding and bonding must be effective and intact while work is being performed to provide maximum protection to workers.

7.25.18. In any case, temporary grounding clamps must be secured and cannot be detached.

7.25.19. The temporary grounding must be short circuit proof and electrically connected to the work object.

7.25.20. Whenever two lines need to be connected to each other, temporary grounds shall be installed on each line section to drain inductions.

7.25.21. When equipment and conductors are grounded, currents related to induce voltage will circulate to ground. Installed grounding sets at different locations can create a hazardous condition, therefore they shall be barricaded to prevent step or touch potential.

7.26. Working on Energized Conductors and Apparatus

7.26.1. Only electrically experienced, trained and authorized employees/ contractors shall perform electrical work against approved “SOP” and “Permit to Work” under the continuous direction and supervision of the job in-charge.

7.26.2. Before working on live line or in electrically conductive/induced environment, conduct an exercise/drill with all involved parties for the job to test the preparation and to know the sequence of job steps. Execution of the actual job must be carried out by the same team.

7.26.3. Work on or handling of any energized electrical conductor, bus bar, etc. up to 36 kV, shall not be permitted without an approved insulated tools, instruments or handle unless one of the following conditions is met:

a. The employee is insulated or guarded from the energized part. (Insulated gloves with sleeves rated for the voltage involved shall be considered for insulation of the employee from the energized part.) Don't only wear leather (non-insulated) gloves when working on energized lines. Insulating sleeves shall be worn with insulating gloves in case exposing the employee elbow and upper arm to contact with other energized parts.

b. The energized part is insulated or guarded from the employee by voltage-rated portable rubber insulated floor mats, insulated working supports or blankets, rubber/plastic plates, or any other non-conductive objects like plywood barriers that prevent accidental contact

7.26.4. The hazard of falling/ touching of tools on live circuits/ breakers shall be understood by all concerned and appropriate precautions shall be taken.

7.26.5. If work is to be done on energized electrical conductor, bus bar, etc., effective supervision of site senior in-charge shall be ensured.

7.26.6. Identify task specific PPE in Permit to Work especially Category 4 Arc flash resistant suite, Arc flash hood, Arc-rated gloves and Arc-rated Fall Protection while working on high voltages (more than 420 V).

7.26.7. Hazards and appropriate protection for work on live circuits shall be effectively communicated to all concerned involved in the job.

7.26.8. The company shall implement and document a system to verify that all established requirements in this paragraph are met. If it is observed that deviations and/or violations are present, the company shall determine and implement adequate actions to prevent and rectify these deviations and/or violations.

7.26.9. When working on live line/circuit more than 36 kV, live line conductive PPE shall be used all the time in hot zone to offer protection against electrical shocks such as conductive shoes, conductive socks, conductive gloves, conductive trousers, and conductive shirts. It is not recommended to use foot powder with protective conductive footwear since foot powder provides insulation and reduces their conductivity.

7.26.10. When working on live line, wear PVC coated full body safety harness for fall protection along with double lanyard for 100% tie to be attached with strong point while climbing and working on the height more than 6 feet/1.8 meter above the ground or impact level.

7.26.11. Emergency Action Plan for Electrical Work.

a. Develop an emergency action plan based on risks identified in the risk assessment study/job safety analysis.

b. Trained First Aider(s) with first aid kit shall be available at all times in the safe zone to assist rescue efforts in the safe zone, when required.

c. No one shall respond to any incident unless he is trained and he has appropriate PPE for the incident.

d. If an abnormal condition is noticed or an emergency is announced, stop the assigned jobs in a safe manner and evacuate the hot zone. All employees and contractors in the hot zone shall report to a temporary assembly point and wait for further instructions.

e. When an overhead line falls or is contacted, take the following precautions,

- Make sure everyone is at least 6.1 meters (20 feet) away from the fallen line.
- Use flag man to protect motorists, spectators, and other individuals from fallen or low wires.
- Place barriers around the emergency area.
- Do not attempt to move the fallen line.
- Do not touch anything that touches the fallen line.
- Be alert to water or other conductors present.

f. If an individual becomes energized or receives an electrical shock, dedicated emergency responders shall use insulated electrical rescue hook to pull away the victim from the electrical source and provide CPR, rescue breathing, or first aid immediately.

g. If an overhead conductor is contacted while operating vehicles or heavy equipment, stop the equipment immediately, it can cause an arc, smoke, or even a fire. Occupants shall remain in the vehicle or heavy equipment cab until the emergency responder breaks the electrical connection.

h. If it becomes necessary to leave the vehicle or heavy equipment, jump out landing on both feet without touching the vehicle. Once out, keep your feet together and either shuffle or bunny hop a minimum of 20 feet (6.1 meter) away from the vehicle or heavy equipment. Take small steps, moving from toe to heel without lifting feet off the ground.

i. Do not return to the vehicles or heavy equipment until the emergency responders have removed the conductor from the vehicles or equipment and confirmed the vehicle is no longer in contact with overhead lines or has no charge.

7.27. Safe Practices for Transformer and Capacitor Installations

7.27.1. Only electrically experienced, trained and authorized employees/ contractors shall perform electrical work near energized equipment against approved Permit to Work.

7.27.2. The Distribution Company shall arrange sufficient quantity of spare distribution transformers for immediate replacement of damaged transformer and to get enough time for proper repair and testing through manufacturer's facility, the Distribution Company's own workshop, or an authorized private workshop.

7.27.3. Electrical equipment and transformers shall undergo routine preventive maintenance, periodic inspections, and testing as per the manufacturer's maintenance guidelines and the relevant SOP. Corrective and preventive maintenance or repairs for all such in-service equipment and transformers shall be carried out at the manufacturer's facility, the Distribution Company's own workshop, or an authorized private workshop, equipped with appropriate testing facilities to ensure reliability and integrity.

7.27.4. A fitness certificate for electrical equipment and transformers shall be issued upon delivery of the repaired equipment and transformer and the certificate shall be retained and preserved at the relevant sub-division or office.

7.27.5. The Distribution Company shall establish and maintain at least one transformer workshop in each district within its jurisdiction, either the Distribution Company's own workshop or an authorized private transformer workshop, equipped with all necessary repair and testing facilities in accordance with NTDC or company specifications.

7.27.6. The Distribution Company shall make sure that no transformer repairs are carried

out in unauthorized transformer workshops.

7.27.7. During repairing of transformer, workers shall empty their pockets of lose articles such as mobiles phones, knives, keys, and watches. Do not allow tools, bolts, nuts, or similar objects to drop into the transformers.

7.27.8. The Distribution Company shall adjust the transformer's output voltage using the transformer tap changer to provide 220 Volts ± 5% to the consumer, in accordance with PSDR 2005. The voltage must not fall below 209 Volts as stipulated in PSDR 2005. If the transformer tap changer is defective or unavailable, the Distribution Company shall replace the faulty transformer at no cost to the consumer and adjust the tap changer accordingly to ensure the consumer receives the appropriate voltage of 220 Volts ± 5%.

7.27.9. Whenever physical protection is required because of close proximity, electrician's rubber protective equipment should be utilized to cover exposed electrical terminals of primary (HT) side and secondary (LT) side such as transformer bushings, fuse cutouts/dropouts, buses, etc. An alternate approach is to install voltage-rated portable rubber insulated floor mats, insulated working supports or blankets, rubber/plastic plates, or any other non-conductive objects like plywood barriers that prevent accidental contact.

7.27.10. Install the LT breaker on the low voltage side of the distribution transformer, either close to the transformer, within a distribution panel, or in an outdoor enclosure, along with appropriately sized and rated HT link fuses. The LT breaker shall provide immediate protection to the transformer and downstream circuits by quickly isolating the circuit in the event of an overload, short circuit, or other electrical faults originating from the consumer's side.

7.27.11. Only fuses with correct standard size and rating shall be used for transformers to protect human and animal lives. Substandard or "rora" type fuses are strictly prohibited.

7.27.12. Distribution Company shall regularly assess the loading position of the distribution transformers and take appropriate measures in form of augmentation of transformers to prevent overloads, breakdowns, and potential accidents.

7.27.13. Work on Energized Transformer:

a. Every possible attempt shall be exercised to avoid working on energized equipment.

b. Job Safety Analysis shall be carried out before carrying out the job.

c. Appropriate personnel protective equipment to be used for the work.

d. When replacing fuses on the high voltage side of transformer, all possible secondary load shall be removed.

e. Insulating tongs, similar to insulated switch sticks shall be used to remove and install fuses.

f. Fuse cut-outs shall be opened or closed in a sure, positive manner by an experienced, trained and authorized employees/ contractors.

7.27.14. Work on De-Energized Transformer:

a. Dry Type Transformer.

- Job Safety Analysis shall be carried out before carrying out the job.
- Power transformer shall be de-energized, isolated and grounded.

b. Liquid-Immersed Transformer.

- Insulating oil shall be handled and stored where it will not be exposed to temperatures approaching the ignition point.
- Static charges can be developed when transformer oil flows in pipes, hoses, and tanks. Oil leaving a filter press may be charged to over 50,000 volts. Filter press, metal hoses, and tanks shall be grounded during oil flow into any tank to accelerate dissipation of the charge in the oil.
- All windings of a de-energized transformer that is having its oil circulated through a filter press or similar equipment shall be grounded for at least an hour after the oil flow has been completed.
- After any oil filtration work, the accumulated air on the transformer shall be released by opening the Buchholz relay vent after the transformer is cooled down.
- Terminals shall not be touched before they are adequately grounded.
- When any quantity of oil is added to a transformer it should remain de-energized for a period of at least 8 hours after filling is complete except while topping up transformer already filled with oil up to conservator or if

the unit is filled under vacuum the time period can be shortened to 1 hour, and when small quantities of oil are added in such a way as to eliminate the formation of air bubbles.

- Precautions shall be taken to avoid developing static charges from oil flow in pipes, hoses, and tanks.
- Terminate the HT cable on HT bushings terminals, labeled as phases R, Y, and B. Simultaneously, the LT cable should be terminated on LT bushings terminals, labeled as phase r, y, b, and n, utilizing lugs of suitable sizes for LT termination. First connect ground connections, followed by LT connections, and finally connect HT connections.
- Transformer should not be energized until oil cools down to ambient temperature after oil circulation/ filtration.

7.27.15. Guidelines for Temporary Transformer Trolley

a. Inspect the temporary transformer trolley, and associated parts for any visible damage. Do not proceed with installation if you notice any issues.

b. Get PTW and provide temporary earthing on HT and LT line from both sides.

c. Place temporary transformer trolley at proper level and stable location. It should be free from water accumulation, flammable materials, and potential contaminants. Clear the area of any obstacles or debris that could impede installation or maintenance.

d. Install the transformer trolley at a safe place on the side of the road to avoid traffic/pedestrian congestion.

e. 11 kV side of the temporary transformer should be towards the 11 kV side of the faulty transformer at the time of installation.

f. Earth the neutral of the transformer trolley with current earthing of the faulty transformer.

g. Earth the body of the trolley of temporary transformer with the current earthing point of the faulty transformer body.

h. Earth the trolley by connecting it to the same earthing of the faulty transformer and ensure that the earthing is correctly installed.

i. Primary (HT) and secondary (LT) leads/cables shall be free of joints.

j. Connect the transformer's primary and secondary leads to the appropriate electrical connections on the trolley. Route input and output connections neatly and securely, avoiding sharp bends or kinks that can damage the lead.

k. Temporary transformer trolley shall have proper fuses having standard size and rating.

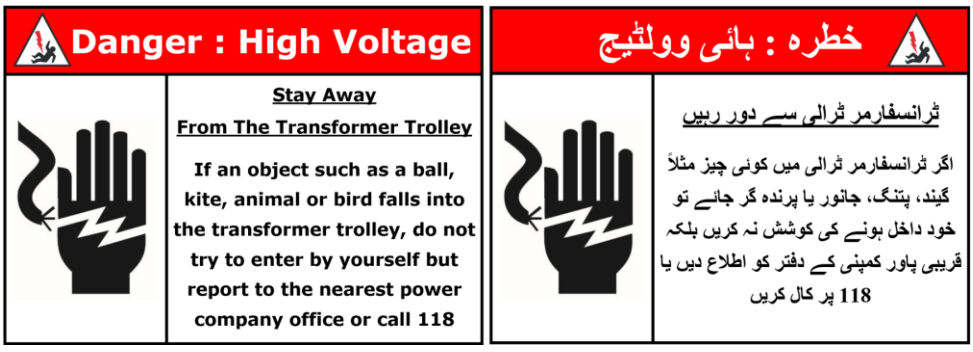
l. Use shackle insulator, supports or clamps as needed to keep consumer service cables organized and in safe place.

m. Maintain proper clearances around the transformer to allow for airflow and heat dissipation.

n. After completion of the work, Line Superintendent/Supervisor shall perform a final inspection to ensure that the installation meets all safety and operational requirements to ensure that there is no possibility of leakage of current

o. Warning signs shall be printed/displayed on all sides of the temporary transformer trolley in Urdu, English, and/or any language understood by the local community. The signs shall be readable at a minimum distance of 5 feet.

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
REGISTRAR
NEPRA



7.27.16. The network owner is responsible for overseeing the inspection and maintenance of in-service conductor/utility cable management at every pole/structure within their service territory and jurisdiction. It's essential to maintain proper clearance between conductors and surrounding infrastructure. The Line Management, Resident Engineer, and Sub-Divisional Officer shall ensure that all conductors/cables are properly managed, in good condition, correctly tensioned,

and free of defects. When slack loops of additional cable are present on the pole/structure, they must be neatly and securely organized to avoid any potential damage.

7.27.17. The Line Management, Resident Engineer, and Sub-Divisional Officer are responsible for securing all consumer service cables with shackle insulator, supports or clamps that are currently wrapped directly around the structure/pole without shackle insulator, supports or clamps to keep consumer service cables organized and ensure public and animals safety. Consumer service cables shall not be directly wrapped around the structure/pole during new or re-connection. Over time, the service cable insulation can deteriorate and puncture due to weather conditions and wind exposure, leading to current leakage in the structure/pole and posing a risk of injury to the public and animals.

7.27.18. All existing and new poles/structures more than 400 Volts and pole/structure mounted transformers shall have prominently displayed and maintained "Danger" sign to warn the general public about the risks of electrocution. These signs shall be clear and easy to understand. Wording on the signs should be in Urdu, English, and/or any language understood by the local community. The signs shall be placed at height of 8 feet (2.5 meters), facing towards the direction from which individuals are most expected to approach, and shall be readable at a minimum distance of 10 feet (3 meters).

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY * NEPRA * REGISTRAR

Danger: High Voltage	خطرہ : ہائی وولٹیج
When it rains, stay three meters (ten feet) away from power poles/structures and dropped conductors.	بارش کے دوران بجلی کے کھمبوں/اسٹرکچرز اور گری ہوئی تاروں سے تین میٹر (دس فٹ) دور رہیں۔

7.28. Electrical and Mechanical Energy Isolation

7.28.1. The company shall ensure the electrical and mechanical energy isolation before any employee/ contractor performs any servicing or maintenance on machinery or equipment or any electrical apparatus, where the unexpected energizing, start-up

or release of any type of energy (electrical, thermal, chemical, potential, kinetic) could occur, cause damage to equipment, injury to personnel and/or environment can be adversely impacted.

7.28.2. Electrical energy isolation shall be conducted in compliance with the company isolation SOP/Procedure such as locking out and tagging out of electrical switches, circuit breakers, or other control devices including the opening of all relevant line isolators, as well as the closure of earth switches.

7.28.3. Complete isolation shall be applied when performing corrective or preventive maintenance on any electrical equipment, apparatus or switchgear. Partial isolation of bus bars or connections is strictly prohibited.

7.28.4. Mechanical energy isolation shall be conducted in compliance with the isolation SOP/Procedure by stopping, locking out and tagging out of all moving parts, such as motors, engines, or rotating equipment by using of mechanical locks to prevent movement including isolation of valves, clutches, brakes, rotating shafts, belts, chains, gears, couplings, tensioning systems, pressure relief devices, hydraulic systems, pneumatic systems, spring-loaded mechanisms, cams and other relevant components.

7.28.5. All electrical circuit conductors and circuit parts shall be considered energized until the source(s) of energy is (are) removed, electrical energy discharged and de-energized through a mechanically secure connection to an effective ground potential. Electrical conductors and circuit parts that have been disconnected, but not under isolation, tested and grounded (where appropriate) shall not be considered to be in an electrically safe work condition, and safe work practices appropriate for the circuit voltage and energy level shall be used. Isolation requirements shall apply to fixed, permanently installed equipment, temporarily installed equipment and portable equipment.

7.28.6. To ensure electrically safe work conditions, the following steps must be taken:

a. Clearly identify the exact work area, including the tag number of the equipment, pole, or structure.
b. Identify all potential sources of hazardous energy and define the working zone limits.
c. Completely disconnect the network from all possible sources of hazardous energy.

d. Secure the network against reconnection by applying lock and tag.

e. Test and verify disconnection by using voltage tester, detector, or beeper appropriate for the rated voltage to confirm that the line is dead.

f. Apply temporary earthing at all sides near to workplace to prevent back-feeding from consumer double supply lines, generators, UPS systems, stored charges from capacitors, lightning strikes, or induced voltage from conductors, apparatus, or transformers.

g. Protect against adjacent live parts by utilizing voltage-rated PPE/T&P along with portable rubber-insulated floor mats, insulated working supports or blankets, rubber or plastic plates, or any other non-conductive materials as needed for partitioning or shielding from potential electrical hazards.

h. Electrician/lineman shall carry a personal or proximity voltage detector (with voltage ranges from 120VAC to 500kV) all the time while working to detect induced voltage from adjacent conductors or circuit, particularly if the earthing clamp is loose or not electrically connected.

7.28.7. In situation where it is not possible to lockout or cable/chain off an isolating device, isolation may be accomplished by removal of fuses, disconnection of electrical cables, or physical removal of component of the system supplying energy to the equipment. The point of physical interruption should be identified with installation and securely fastening of "Danger Card/ Tag – Do Not Operate or Remove Tag" with purpose/ reason of installation, date and time of installation, isolating location/ equipment, Card/ Tag installer name, his/her badge number, contact number and signature. No individual shall attempt to remove Danger Card/ Tag except installer, after verification when it is safe to do so.

7.28.8. When the job or task is completed, the lock/tag installer must carefully remove locks/tags from designated locations or points to avoid the inadvertent removal of incorrect locks/tags, as doing so can lead to the introduction of hazardous conditions.

7.28.9. Up-to-date drawings shall be considered a primary reference source for isolation location. When up-to-date drawings are not available, the company shall be responsible for ensuring that an equally effective means of locating all sources of energy is employed.

7.28.10. All personnel who are performing isolation and de-isolation shall be experienced, trained, competent and authorized.

7.28.11. All personnel who are required to actually do the electrical isolation shall wear

proper PPE to ensure safe switching Off & On and applying isolation.

7.28.12. No individual shall attempt to start, energize, use, or operate a piece of equipment that has been isolated. The company shall implement lockout/ tagout (LOTO) systems to prevent any accidental energizing of equipment.

7.28.13. Isolation is completed only when no associated control device, such as a push button, control interlock or automatic start-up control circuit, shall have the capability of energizing equipment.

7.28.14. Verification test shall be conducted on each isolating device and on each piece of equipment isolated.

7.28.15. Sometimes de-energized circuits may become energized because of the following reasons:

- Switching errors,
- Unusual conditions which may bring an energized conductor into electrical contact with the de-energized circuit,
- Back feeding of current from any generating source i.e. Generator or UPS,
- Lightning strikes (All work on or near apparatus where a lightning strike may cause personal injury should be suspended immediately),
- Stored charges from capacitors, cables, transformers, motors, and generators.

7.28.16. Mechanical isolation of Vessels & Pipes can be achieved by any of the following:

- Valve closure with use of blinds at Inlet and Outlet.
- Removal of pipe spool with the use of blind flange.
- Double block & bleed with use of blind.
- Removal of mechanical couplings.

7.28.17. The blind shall be of the manufacturer recommended thickness and material.

7.28.18. The blind rating must be equal to the pressure setting of the pressure relief valve protecting the line or equipment.

7.28.19. If there is no pressure relief valve, then the rating must be equal to lowest rated equipment in the system (most likely pipe flange).

7.28.20. Each blind must have a handle that can be easily identified.

7.28.21. Prior to blind installation, the following documents need to be prepared:

- Blind list and the blind register.
- Marked Process and Instrument Drawing (P&ID) reflecting numbered locations of blinds.

7.28.22. Operation staff is responsible for identifying physical locations of blinds.

7.28.23. Permit to Work issuer and receiver shall cross check between the Process and Instrument Drawing (P&ID), blind list and the blind register before installation of blinds.

7.28.24. The company shall establish and maintain systems to prevent the accidental removal of safety systems that would lead to unsafe situations. These systems include the implementation of lock out/ tag out (LOTO) systems.

7.28.25. When the job or task is completed, appropriate tests and visual inspections shall be conducted before electric circuits or equipment are re-energized to verify that all tools, mechanical restraints and electrical jumpers, short circuits, and temporary protective grounding equipment have been removed, so that the circuits and equipment are in a condition to be safely energized. All workers involved in these activities shall acknowledge that they have completed their work and understand that the system will be energized.

7.28.26. Operation staff shall physically verify the removal of blinds in field and update the blind register accordingly.

7.29. Permit to Work

7.29.1. The company shall apply Permit to Work System and the work shall be carried out only when there is a valid permit to work issued for corrective and preventive maintenance activities, etc.

7.29.2. The Permit to Work System shall be applied when;

a. The hazards associated with the activities can result in immediate danger to life or health (i.e., lost time injury, disability or death) of personnel involved in work and/or other personnel in or around the facility.

b. Damage to company assets or property i.e., physical damage, fire/explosion damage, loss.

c. Significant impact on the environment by way of toxic release, or pollution, etc.

d. Permit to Work shall be applied for all critical activities such as but not limited to; welding, cutting, grinding, maintenance and repair electrical apparatus, de-energized/ energized activities, hydro-jetting, lifting, work at elevated areas, confined space entry, excavation, equipment/line opening and any other activity as defined by company.

e. An "Equipment/Line Opening Permit" shall be obtained when flammable, combustible, toxic, or other hazardous materials will be released at levels that could pose a risk to personnel, property damage, or the environment when opening manholes, flanges, lines, removing valves from pipelines containing hazardous materials, or swinging blinds.

f. If the potential release is flammable or combustible, a Hot Work Permit and an Equipment/Line Opening Permit shall not be issued simultaneously.

g. Equipment and/or pipelines must be assumed to be full, under pressure, or under vacuum when specifying PPE requirements for an Equipment/Line Opening Permit.

h. PTW Receiver shall specify personal protective equipment (PPE) in the PTW and PTW Issuer shall verify in accordance with SOP/JSA/MSDS for the "Equipment/Line Opening Permit," which may include goggles, face shields, boots, rubber gloves, coveralls, aprons, hoods, canisters, or SCBA sets. It is mandatory to wear SCBA whenever toxic gases are likely to be released.

i. Permit to Work shall be issued and received only by trained and authorized Permit to Work Issuer & Receiver. Company shall establish specific training requirements for these functions as well as maintain a list of staff who is authorized to act as a permit to work issuer or receiver.

j. Permit to Work shall cover all hazards, PPE requirements, Exact Work Location, Apparatus/ equipment number, Job/ Work Order Number, Work Description, Isolation/ Lockout/ Tagout application, Barricade at job site, job briefing with all involved person including discussion of any job-related hazards. A Permit to work is only valid for the time and date as specified on the permit.

k. All internal and external affected parties shall be informed in writing or get counter signature on permit to work for necessary precautions before issuing permit to work.

l. Permit to Work Issuer must confirm that the necessary safety precautions are in

place before issuance of PTW and commencement of work. Additionally, he should conduct periodic visits to the work site to ensure ongoing compliance with safety protocols.

m. Permit to Work Receiver shall obtained a copy of the Permit to Work and shall keep it at the work site.

n. Permit to Work Receiver must remain vigilant and keep an eye on worker to prevent unsafe acts/violations. In case of non-compliance or if the worker is taking short cuts due to overconfidence and complacency, remove worker from the team to save his/her live.

o. Permit to Work Receiver shall remain at work site continuously when the job activities are in progress to adequately supervise the work till completion of the work, however, if Receiver must leave the job site for any reason, for example to obtain additional tools or equipment, tea/ lunch/ washroom break, or prayer, etc., then an another Receiver that is certified and authorized can be delegated to carry out the responsibilities of the Receiver during the remaining part of the job or the job shall be stopped till break time and all workers shall be out of designated job site/barricaded area. The delegated Receiver shall write his/her badge number and sign the Permit to Work.

p. A receiver may receive more than one permit, if the jobs are under his/her direct control span based upon the nature, hazards, and job criticality at one location and on the same level where the receiver can monitor all activities and easily see them visually to prevent any incident.

q. When a test or trial run is necessary to verify the functionality of equipment, machinery, packages, or systems after maintenance, repair, or installation work, all tools and personnel must be removed prior to the removal of temporary earth connections and removal of isolation and lockout/tagout (LOTO) measures. Subsequently, all work permits shall be cancelled or closed before energizing and commencing of test or trial run. If additional maintenance or repair work is needed, the necessary work permits must be reissued accordingly.

r. Upon completion of all tasks on equipment, machinery, packages, or systems after maintenance, repair, or installation work, Work Permit Receiver shall carried out housekeeping, remove all tools and waste, and physically confirm that all staff members have withdrawn before work permit cancellation/closure.

s. Before energizing and starting operations, all Permit to Works must be cancelled/closed by all the Issuers and Receivers.

7.30. Tools, Portable Power Tools and Heavy Equipment

7.30.1. All heavy equipment, machinery, power driven tools and other hand-held portable equipment shall be periodically inspected and frequency shall be clearly defined as per manufacturer's recommendation. An inspection tag shall be pasted on each in-service heavy equipment, machinery, power driven tools and other hand-held portable equipment. Instrument/ equipment which is regularly calibrated and a calibration certificate is available, shall be considered as inspected.

7.30.2. Implement a "color scheme" for quarterly inspections of tools/equipment by applying PVC tape, spray, or paint. For instance, use white for winter (January, February, and March), green for spring (April, May, and June), blue for summer (July, August, and September), and orange for autumn (October, November, and December). Yellow tag/PVC tape shall be used for tools/equipment awaiting inspection, while red tag/PVC tape shall be used for failed, dangerous, damaged, or rejected tools/equipment.

7.30.3. All equipment's and its accessories including outsourced equipment's inspection tags/certification for validity and physical condition shall be checked at main gate/entrance prior to entering the facility. No equipment shall be permitted for use without inspection tag within the facility.

7.30.4. Employee/ Contractor who use tools must be properly trained and authorized to use, adjust, store and maintain tools properly. Electrical hand tools shall be properly grounded or be of the double insulated type. All tools shall be free from defects and maintained in good condition.

7.30.5. The number of accidents involving the use of tools can be reduced by following basic safety principles:

- Keep all tools in good condition with regular maintenance.
- Calibration of testing equipment shall be arranged on time as per manufacturer's manual.
- Use the right tool for the job.
- Inspect each tool for damage before use.

- Operate according to the manufacturer's instructions.
- Provide and use the proper protective equipment (PPE).
- Safety guards and face shield shall be used while operating power-driven rotating tools.

7.30.6. Examples of Non-Powered Hand Tools; Hand tool is any tool that is powered by hand, rather than a motor. Categories of hand tools include wrenches, pliers, cutters, striking tools, struck or hammered tools, screwdrivers, vises, clamps, snips, saws, drills and knives. Portable power tools are not hand tools.

7.30.7. Pliers, wrenches, etc., whether insulated or not, shall not be used without rubber gloves while working near live parts.

7.30.8. A Power-driven tool is a tool powered by an electric, hydraulic, or pneumatic power or by an internal combustion engine such as grinder/ grinding machine, disc cutter, electric drilling machine, welding machine, hydro-jetting machine, bench grinding machine, air compressor, cutting machine, blowers, sand/ grid blasting machine, jack hammer, hydraulic jacks, and battery-operated drill machine, etc.

7.30.9. Examples of heavy equipment are; heavy lifting, elevating, and mobile equipment, bulldozers, skid mounted support equipment, excavators, cranes (all types), tractor-scrapers, riggers, graders, below the hook lifting devices, wheel loaders, wheel dozer (soil compactor), forklift, backhoes, personnel platforms/ man-baskets/ man lift/ bucket mounted vehicles, elevating equipment, aerial platforms, side boom tractors, overhead hoists, etc. including insulated aerial bucket, that successfully passed dielectric testing of the insulated portion of the boom and bucked.

7.30.10. Wooden pads shall be provided to all outrigger to evenly distribute weight, minimizing the risk of surface damage underneath and preventing the crane or bucket-mounted crane from toppling over.

7.30.11. The heavy equipment drivers/operator shall hold a valid government license/Heavy Transport Vehicle (HTV) license, appropriate for the type and size of the heavy equipment and shall be certified and trained for the equipment he/she operate.

7.30.12. Heavy equipment drivers/operator card shall be obtained from relevant government authorities responsible for certification/licensing/testing or from third party agencies registered with the Pakistan Standards and Quality Control Authority

for heavy equipment operator certification.

7.30.13. The validity period of a heavy equipment operator card ranges from 1 to 5 years for specific equipment, based on criticality and risk level.

7.30.14. Heavy equipment drivers/operator card shall be issued to a person who has a satisfactory medical certificate, have a valid relevant government license/Heavy Transport Vehicle (HTV) license, and successfully pass both theoretical and practical examination for a specific equipment.

7.30.15. The heavy equipment operator card shall include, but is not limited to the following details:

7.30.15.1. Card number.
7.30.15.2. Holder's photograph.
7.30.15.3. Full name.
7.30.15.4. Equipment type and capacity.
7.30.15.5. Company name.
7.30.15.6. Date of issue and expiration date.
7.30.15.7. Issuing authority or third-party agency information, including contact numbers.
7.30.15.8. The card shall contain the statement "This is not a driving license".

7.30.16. Certified operators shall carry their original card with them at all times, along with a valid driving license.

7.30.17. Trainees or apprentices may work without a government license and certificate/card under the direct supervision of licensed and authorized operators to gain necessary training and experience.

7.30.18. When heavy equipment, including cranes, aerial devices, mobile elevated aerial platforms, man-baskets, man-lifts, or bucket-mounted vehicles, is operating near live electrical circuits/energized power lines, shall maintain minimum clearance distances from these live electrical circuits/energized power lines, as mentioned in the table below. Only qualified and trained personnel shall be allowed to operate and work on equipment in close proximity to live electrical circuits/energized power-lines while wearing the necessary personal protective equipment (PPE). Insulated or uninsulated heavy equipment or construction machinery such as a forklift, excavator, bulldozer, wheel loader, backhoe, grader, crane, dump truck, man-baskets, man lifts, bucket mounted vehicles, etc. must be protected by

providing grounding and bonding connections to dissipate any potential electrical charges when working in an electrically conductive, near live line or when protection is required against potential energization of the line or monopole/tower/structure or back-feeding from consumer double supply lines, generators, UPS systems, stored charges from capacitors, lightning strikes, or induced voltage from conductors/ cables/ transformers. Insulated heavy equipment, including those with rubber tires and wooden supports, is not foolproof. Over time, insulation may deteriorate or get damaged due to environmental exposure, wear, or physical damage. Even with insulation, there's still a risk of electrical charge to pass through, or heavy equipment large metal objects can accumulate induced voltages, especially under high voltage conditions. A person touching heavy equipment (touch potential) or standing near heavy equipment while touching the ground (step potential) could be electrocuted. Grounding and bonding provide an additional layer of protection to safely dissipate any electrical charge that might be transferred to the heavy equipment protecting both the equipment and nearby personnel from various electrical risks. A designated supervisor and signal-man shall ensure the following minimum safe distances shall be maintained all the time to prevent electrocution, equipment damage, and fires.

No.	Voltage AC	Minimum Safe Distance for Uninsulated Heavy Equipment	Minimum Approach Distance for Insulated Heavy Equipment
1.	400 Volts and below	3 Meters (10 Feet)	18 Inches
2.	11 kV	3 Meters (10 Feet)	4 Feet
3.	33 kV	4.3 Meters (14.2 Feet)	5 Feet
4.	66 kV	5 Meters (16.4 Feet)	6 Feet
5.	132 kV	6.9 Meters (22.8 Feet)	8 Feet
6.	220 kV	8.5 Meters (28 Feet)	12 Feet
7.	500 kV	12.2 Meters (40 Feet)	25 Feet

Note-1: Distances listed are for standard conditions, extra care must be taken, if standard conditions do not exist.

Note-2: When operating insulated heavy equipment near live electrical circuits/energized power lines, avoid using uninsulated lifting accessories, such as slings, hooks, or rigging equipment's. Choose non-conductive lifting accessories made of materials that do not conduct electricity.

7.30.19. Use non-conductive insulated measuring stick to verify clearance distances.

7.31. Working at Height

7.31.1. The company shall ensure safety requirements for the erection, inspection, working and dismantling of scaffolding structure at site as per SOP against approved Permit to Work.

7.31.2. Scaffolds shall be designed and constructed according to Good International Industry Practices. As a minimum a scaffold shall be equipped with safe access to all working floors, work floors that are covering the whole accessible area and are free of openings; protection to all sides where a fall hazard of more than 6 feet exists by a top-rail and a mid-rail.

7.31.3. A comprehensive scaffold design package, necessary for erecting a complete scaffold, should comprise drawings, design loads, specifications and sizes of scaffold materials, manufacturer's technical data for couplers and fittings, and any structural calculations required, especially for special scaffolds or upon request for other scaffolds.

7.31.4. All scaffold materials shall be inspected prior to use. Damaged material shall be removed from site.

7.31.5. Scaffolds shall be constructed by qualified scaffolders, who are trained in the right work methods as well as familiar with working at height requirements. Scaffolders will always be provided with fall protection with double lanyards when working at levels higher as 6 feet above the ground. They shall follow the 100% tie off rule.

7.31.6. Only a specialized scaffold erector is authorized to design, erect, alter, inspect, and dismantle special scaffolds and scaffolds exceeding 12.2 meters in height.

7.31.7. The Civil/Structural Engineer is responsible for reviewing Special Scaffold Plans and calculations to ensure the structural integrity and soundness of the proposed scaffold design.

7.31.8. A Civil/Structural Engineer with expertise in scaffold design analysis shall approve Scaffold Plans for the following special scaffolds:

a. Scaffolds exceeding 38 meters (125 feet) in height.

b. Cantilevered scaffolds extending outward by more than 3 meters (10 feet).

c. Scaffolds (excluding bracket scaffolds) with a total platform area exceeding 30

square meters (320 square feet), supported by or hung from an existing structure or within 3 meters of another scaffold supported by the same structure.

d. Scaffolds supporting loads exceeding 240 kg/square meters, including piping, equipment, masonry, new or existing structures, or loads other than workers and their materials.

e. Scaffolds supported by one or hung from one or more outrigger beams.

f. Scaffolds supported by or hung from wind girders or roofs of floating roof tanks.

g. Scaffolds located inside confined spaces with non-even or rounded surfaces, such as reactors or spherical tanks.

h. Formwork shoring constructed of scaffold materials supporting elevated concrete slabs/decks over 300 mm thick.

7.31.9. To shift scaffolding material, planks and tubes safely from ground level to height and vice versa, precautions shall be taken to prevent falls. Secure the materials, planks, and tubes using straps, ropes, or bungee cords before lifting them with a pulley system. Additionally, ensure that scaffolding planks and tubes are securely fastened using clamps to prevent slipping, falling, or displacement during lifting. Scaffolding materials, planks and tubes shall not be shifted manually from ground to height by helpers' hand to hand. Barricade the area or install safety nets underneath to mitigate the risk of falling materials.

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7.31.10. A gate or drop bar shall be installed to secure the scaffolding platform for safe access when getting on or off using the ladder.

7.31.11. The company shall provide protection against fall hazards, such as guardrails, safety nets, full body safety harness, positioning devices or fall restraint systems.

7.31.12. Prior to the use of a scaffold, the scaffold shall be inspected by a qualified scaffold inspector. The inspection result shall be clearly marked at the entrance of the scaffold. Only qualified scaffolders are allowed on a scaffold that is not inspected or where the inspection results show the scaffold is not safe to use.

7.31.13. At least once every two weeks a scaffold will be re-inspected to verify it is still safe.

7.31.14. All scaffolds that are not inspected, show visible damage, are modified or have other safety concerns shall be closed-off for general workers until hazards have been rectified by scaffolders and the scaffold has been inspected.

7.31.15. The scaffold shall be protected from electrical hazards. Electrical conductors shall be de-energized and electrically grounded. Scaffold and platform shall not be less than 10 feet (Minimum Safe Distance) from energized electrical conductors, even greater distances are required at very high voltages.

7.31.16. There must be no simultaneous or overlapping of different jobs at a same location.

7.31.17. If using power tools on a scaffolding platform, ensure external grounding is in place.

7.32. Ladders

7.32.1. The company shall ensure the inspection of all in-service ladders before use and remove defective ladders. Ladder shall be properly secured at the top and provide stable footing while being used. Ensure ladders extend a minimum of 1 m (3 ft.) above the top landing point. In general, set ladders at a 4:1 slope. When climbing up or down any ladder, face the ladder and maintain three points of contact with hands free of materials. Only single person can use it at a time. Metal ladder shall not be used when working on or near electrical equipment or conductors; use only non-conductive ladders.

7.32.2. Fall protection must be provided for employees climbing or working on FIXED ladders above 24 feet. Fall protection is not required for employees while climbing or working on portable ladders unless it is anchored on a rigged anchorage point at height, having fall clearance safety factor three (03) feet from impact level or ground level.

7.32.3. All poles, towers and structure shall be carefully inspected before climbing to assure that they are in a safe condition for the work to be performed and that they are capable of sustaining the additional or unbalanced stresses to which they will be subjected. The types of abnormalities that should be checked are cracks, damages, and deteriorations in poles, towers and structure and its foundation.

7.32.4. If poles, towers and structure are unsafe for climbing, they shall not be climbed until made safe by guying, bracing or use mobile elevated aerial platform, man-baskets, man-lift or bucket mounted vehicle instead of ladder.

7.33. Excavations

7.33.1. Excavation shall be done against approved Permit to Work.

7.33.2. The company shall establish proper excavation techniques including sloping, shoring, shielding or benching/stepping as per soil type to minimize the risk of the

cave-in and damage to the underground services (Utilities). Piping and cable detector should be used. When underground piping or electrical installations are suspected, mechanical excavators shall not be used until all obstructions have been exposed by manual digging.

7.33.3. As-Built underground utilities drawings should be considered to identify electrical cables/pipes. Appropriate parties shall be notified to isolate identified utilities before beginning any excavation in the area.

7.33.4. If electrical live cable de-energization is not feasible, the suitable protection measures should be applied such as, providing a wooden box around the cable, providing protective sleeve for the cable, insulating personnel and equipment from possible electrical contact. Insulation of hand tools. Adopting test trenches excavation method by using hand tools to unveil underground pipes and electrical cables, etc.

7.33.5. Ensure proper communication done with local authorities for road closure. Where there is a likelihood of public, vehicles or equipment falling into an excavation, suitable barriers shall be erected including fencing of the excavation area, supervision, flagmen, traffic control and other measures required to ensure the safety of public at all times. Blinking warning lights should be used during dark to mark the limit of the work.

7.33.6. Restrict the movement of heavy machinery or vehicles in surrounding of excavated area, to avoid any collapse.

7.33.7. Trenches exceeding 4 feet (1.2 Meters) in depth should be treated as confined spaces.

7.33.8. Provide suitable entry and exit points for the excavation.

7.34. Welding and Cutting

7.34.1. The company shall ensure safety while performing welding and cutting work at site against approved Permit to Work.

7.34.2. Welding and cutting booth shall be covered with fire blanket to contain sparks during activity. Sufficient lighting to be provided once working at night.

7.34.3. Welding and cutting sparks shall not fall on gas cylinders, flammable materials or operating equipment.

7.34.4. Combustibles around the welding and cutting work area shall be removed.

7.34.5. Oxygen and fuel cylinders should not be stored together.

7.34.6. Gas Testing shall be conducted as per Task Risk Assessment/ JSA/ Permit to Work at same elevation and above/ below elevation to test accumulation of explosive mixture.

7.34.7. Arrange trained Fire watch with adequate number of fire extinguishers.

7.34.8. Provide proper grounding during welding.

7.34.9. Use appropriate PPE for the job such as Welder Face shield, Mask, Leather Gloves and Welding Shade Number.

7.35. Hydro-jetting

7.35.1. The company shall consider following precautions during hydro-jetting activity for equipment cleaning:

a. All workers performing hydro-jetting job shall be trained and experienced for high pressure water jetting job and shall have the required certificate.

b. Provide and use task specific PPE for hydro-jetting activity such as helmet with strap, face shield over mono-goggles, cut-resistant suit, respiratory protection (when require for confined space), gloves for hydro-jetting grip, metatarsal boots and hearing protection (Noise more than 85dBA). Use specialized ultra-high pressure PPE suit for Ultra High pressure (40K Psi) for hydro-jetting job.

c. There are two levels of high pressure washing, based on the water pressure used:

- High pressure water blasting from 5,000 to 30,000 psi
- Ultra-high pressure jetting – greater than 30,000 psi

d. Ensure proper working of Dead Man handle of the hydro-jetting equipment before start of work.

e. Before attempting to inspect or adjust any component of the hydro-jetting machine, the Foot-Control Valves (dump valves) must be not pressed.

f. The anti-withdrawal device must be used on all flex lances, rigid lances and line moling activities. The anti-withdrawal device must be securely attached to the equipment being cleaned.

g. Make arrangement for saddle holder for smaller equipment hydro-jetting, to prevent wrong holding of hydro-jetting gun.

h. Cover all sides completely by trampoline to avoid high pressure water jet escaping during hydro-jetting work.

i. Hydro-jetting shall be done against approved Permit to Work.

j. Install a Chicago coupling and attach a whip check safety device/arrestor (minimum of 1.5 times the hose's rated pressure) with one end of the hose and the other end is secured to a fixed object or another section of the hose. This ensures the high-pressure hose remains anchored, preventing violent dislodgment or movement.

7.36. Ionizing Radiation

7.36.1. The company shall establish, implement and maintain a program to ensure safe use, handling, managing, processing, operation, storage, transport and monitoring of radioactive materials, equipment and its waste such as gamma rays, X-rays, alpha particles, and beta particles, or indirectly such as neutrons, used for industrial purpose in compliance with applicable national and provincial legal requirements to protect people and the environment from harmful effects of ionizing radiation. The company shall regularly monitor radiation workers, who are likely to receive an effective dose of radiation, for corrective and preventive actions.

7.36.2. The company shall ensure that the relevant contractor is approved with Pakistan Nuclear Regulatory Authority.

7.37. Hazard Communication Program

7.37.1. The company shall establish, implement and maintain Hazard Communication Program to identify onsite available chemical inventory along-with its hazards detail as provided in Material Safety Data Sheet (MSDS), apply labeling and tracking system for all chemicals, manage required PPE for handling of hazardous chemicals and provide necessary awareness training to relevant employees and contractors. Material Safety Data Sheet (MSDS) shall be maintained for all hazardous chemicals and made readily available to all interested parties.

7.37.2. Install eye wash stations in areas in accordance with the Material Safety Data Sheet (MSDS), where chemicals are handled and processed.

7.38. Polychlorinated Biphenyls (PCBs)

7.38.1. Polychlorinated biphenyls (PCBs) are classified as carcinogens, highly toxic, non-conductive and non-combustible liquid used in some transformers and capacitors. It is hazardous to aquatic life and persist in the environment for long periods of

time. They can accumulate in food chains and may produce harmful side effects. PCBs and PCB-containing equipment, transformer, oil and items shall not be introduced at company facilities.

7.38.2. The company shall establish, implement and maintain a program to ensure safe use, handling, managing, processing, operation, storage, transport and monitoring of Polychlorinated biphenyls (PCBs) and its waste in compliance with applicable national and provincial legal requirements to protect people and the environment from harmful effects of PCBs.

7.38.3. The company shall ensure all materials, oil and items introduced at site are certified PCB-free.

7.38.4. The company shall consult Pakistan Environmental Protection Agency or Provincial Environmental Protection Agency, if any suspected PCB material found.

7.38.5. In case no suitable PCB-free materials, oil or items are commercially available, a written approval/ waiver shall be obtained from Pakistan Environmental Protection Agency or Provincial Environmental Protection Agency for purchasing, handling, replacement and disposal purposes.

7.38.6. Existing stocks of PCBs and equipment containing PCBs shall be identified. These shall be marked and removed/ replaced as soon as feasible, as per aforementioned requirements.

7.39. Asbestos and asbestos-containing materials, equipment and items

7.39.1. Asbestos is a naturally occurring silicate mineral with long, thin fibers. Asbestos materials become hazardous when asbestos fibers become airborne, which happens when materials are damaged. Inhalation of asbestos fibers can cause significant health problems therefore company shall ensure asbestos and asbestos-containing materials, equipment and items shall not be introduced into company facilities.

7.39.2. The company shall establish, implement and maintain a program to ensure safe use, handling, managing, processing, operation, storage, transport and monitoring of asbestos and its waste in compliance with applicable national and provincial legal requirements to protect people and the environment from harmful effects of asbestos.

7.39.3. The company shall ensure all materials and items purchased are asbestos free.

7.39.4. Available asbestos materials shall be identified and dispose properly when not required.

7.39.5. The company shall consult Pakistan Environmental Protection Agency or Provincial Environmental Protection Agency, if any suspected asbestos material found.

7.39.6. In case no suitable asbestos free materials are commercially available, a written approval/waiver shall be obtained from Pakistan Environmental Protection Agency or Provincial Environmental Protection Agency for purchasing, handling, replacement and disposal.

7.40. Work Over or Adjacent to Water

7.40.1. The company shall provide adequate lifesaving and rescue equipment at every workstation where work is being carried over or adjacent to water.

7.40.2. Life vests (or life jackets) shall be worn by employee/ contractor when working over water full body safety harness with double lanyard for 100% tie all the times shall be used to avoid fall hazard.

7.40.3. Keep ready lifebuoy rings (often called life rings or life preservers) to throw to someone who's fallen in the water to rescue him.

7.40.4. The company shall ensure that people that have fallen in water can be easily and swiftly be rescued and/or brought to the shore.

7.41. Adverse Weather

7.41.1. The company shall routinely monitor weather conditions, both day and night, across its operational areas, especially in monsoon season. When inclement weather is expected, necessary corrective and preventive measures and precautions shall be implemented to ensure safe and continual operations, preventing incidents that could harm employees, contractors, the general public, animals, or result in loss of equipment or property.

7.41.2. Information regarding forecast of adverse weather shall be immediately reported to all interested parties in order to gain early warning of any forthcoming weather issues.

7.41.3. Adverse weather conditions include:

a. Strong winds,

b. Heavy and continued sandstorm,

c. Lightning and thunderstorms,

d. Extremely hot and humid weather,

e. Medium to heavy rainfall/snowfall,

f. Fog and/or smog,

g. Floods,

h. Earthquake.

7.41.4. Emergency Guidelines

7.41.4.1. Preparation

a. Conduct assessments for grid yard, substation and critical infrastructure to identify potential adverse weather hazards.

b. Set up flood barriers, protection bunds and water-tight doors to protect vulnerable areas from flooding.

c. Stockpile essential supplies, including sandbags, water pumps, emergency repair materials and vehicles.

d. Conduct frequent safety checks within each shift on electrical equipment to ensure they are functioning correctly and safely.

e. Ensure all staff are trained in adverse weather response procedures and safety protocols.

f. Have an emergency and repair team on standby in day and night shifts to address any issues immediately.

g. Ensure spare emergency trolley-mounted transformers and a sufficient quantity of reclaimed transformers of all capacities are ready. Shift defective transformers to an authorized workshop for immediate repair.

h. Ensure the availability of power for drainage pumping stations in all areas to remove flood water.

i. Work closely with local authorities and emergency services to coordinate adverse weather response efforts.

j. Establish clear communication plans for coordination and alerts during emergencies with staff, local authorities and public.

k. Raise awareness among the public about the importance of keeping away from network system and grid stations during adverse weather.

7.41.4.2. During Adverse Weather

a. Continuously monitor weather reports and water levels around critical infrastructure.

b. Utilize remote control systems to manage grid operations if physical access becomes impossible.

c. Safely shut down non-essential systems to reduce the risk of damage.

d. In case of any danger to lives and property due to adverse weather conditions, disconnect the supply to the specific area to save lives and control hazardous conditions.

7.41.4.3. Post- Adverse Weather Actions

a. Conduct post-adverse weather assessments and patrols to identify and fix network hazards.

b. Do not start work on the de-energized lines until isolation is applied by turning off the main circuit breakers and unplugging any electrical devices, lockout and tagout have been completed, and a work permit has been issued. Use a contact or non-contact voltage tester, detector or beeper to confirm that the line is dead. Provide temporary earthing on both sides of the line/equipment, whether it is high tension (HT) line or low tension (LT) line to safeguard against potential energization or back-feeding from stored charges from capacitors or lightning strikes. Use non-conductive tools, electrical rubber gloves, rubber sleeves, and a full-body safety harness with a positioning belt along with double lanyard for working at heights.

c. Thoroughly inspect all equipment and infrastructure for damage after adverse weather. Do not attempt to repair any equipment that is still wet. Allow sufficient time for the equipment to dry completely, or use appropriate drying techniques. Clean the equipment to remove any dirt, mud, or contaminants left by the floodwater.

d. Carry out necessary repairs and maintenance to restore full functionality.

e. Check all components such as circuit boards, wiring, connectors, and insulation for signs of water damage, corrosion, or short circuits.

f. Perform thorough electrical testing (e.g., insulation resistance testing, continuity testing) on all repaired equipment before reconnecting it to a power source.

g. Install barricades and warning signs around hazardous areas, and use blinking warning lights at night until the hazardous condition is resolved.

7.42. Environmental Management

7.42.1. The company shall establish, implement, monitor, and maintain environmental management system as per applicable legal requirements.

7.42.2. An Initial Environmental Examination (IEE) or Environmental Impact Assessment (EIA) study shall be conducted in accordance with the Environmental Protection Agency guidelines to assess the potential environmental impacts of the project throughout its lifecycle.

7.42.3. The project shall obtain the required No Objection Certificate (NOC)/approval from the Environmental Protection Agency.

7.42.4. The company shall implement pollution control measures to mitigate/ minimize the adverse environmental impacts of their operations in accordance with Environmental Protection Agency requirements. These measures could address air quality, water quality, noise levels, waste management, and natural resource conservation.

7.42.5. The company shall meet government emissions reduction targets to reduce its carbon footprint. This involves implementing measures to reduce greenhouse gas emissions, particularly from fossil fuel-based power generation. This can include adopting cleaner technologies, improving fuel efficiency, and implementing emission control measures.

7.42.6. Waste management system shall address reduce, reuse and recycle approach with safe handling, storage, transport and disposal of hazardous materials and waste (gaseous emissions, liquid effluent and solid waste) in accordance with

currently accepted industry practices and applicable national and provincial legal requirements.

7.42.7. The company shall ensure that the hazardous materials and waste are properly labeled. Separate areas shall be marked for storage of hazardous material and hazardous waste stored for disposal.

7.42.8. Segregation of combustible and non-combustible material to be done while dumping waste material.

7.42.9. Waste Disposal System shall address each type of waste (construction, chemical, sludge, ash, sanitary, medical, scrap and sewage) and shall also identify the steps to be taken, to treat the wastes or otherwise prevent them from polluting the ground water, sea or river, canal, or from becoming a public nuisance or hazard.

7.42.10. The company shall identify all waste water streams generated during his activities and their treatment, monitoring and disposal philosophy. The waste disposal contractor, disposal method and location shall be approved by local authorities and Environmental Protection Agency.

7.42.11. Strict control should be exercised over the issue and return of unused explosives. Precautions should be taken to ensure no jettisoning or concealment of explosives or detonators underground.

7.42.12. All industrial waste generated within the company not intended for recycling or reuse shall be treated and/or disposed of at approved waste treatment/disposal facilities in accordance with local authorities and the Environmental Protection Agency. In the absence of such requirements, the waste shall be treated and/or disposed of within one hundred and eighty (180) days of the waste being generated.

7.42.13. Storage period for dangerous medical waste shall not exceed 24 hours. The storage period in the storage room shall not exceed 24 hours and 72 hours in the freezer unit. The storage site shall be equipped with adequate air- conditioning, lighting, and ventilation and the temperature ranges shall be 15-18 °C.

7.42.14. Waste shall be secured from unauthorized access, and to ensure it remains inaccessible to animals and birds.

7.43. HSE Signs

7.43.1. The company shall develop, implement, install and maintain HSE Signs at all sites as required, for specific hazardous conditions, to warn employees, contractors, visitors and general public.

7.43.2. The fixed "Danger Sign" shall be installed at places where an immediate hazard/ danger exists such as grids, substations, transformers, etc.

7.43.3. The fixed "Caution Sign" shall be installed at places where it is required to warn against potential hazards or to caution against unsafe practices.

7.43.4. Safety "Instructional Sign" shall be installed at places where permanent Safety requirement need to be installed such as HSE requirements or Personnel Protective Equipment required, etc.

7.43.5. Signs shall be placed as close to the area or equipment of coverage as possible and within buildings to assist personnel to escape. Signs shall be clear, easy to understand, consistent throughout the facility and placed for optimum visibility. Pictorial signs with consistent color codes are preferred. These "Signs" shall be understandable to employees/contractors/visitors and the sign words shall be in Urdu, English and/or in a language understood by locals and workers. The signs shall be readable at a minimum distance of 5 feet.

7.43.6. "Caution Tag" shall be used for temporary purpose for an existing hazard to avoid an incident, such as Do Not Operate Tag, Danger Tag and Caution Tag shall be developed and made available at each site. The tag shall have a hole on the top to run a thread that shall be used to tie the tag with the equipment. The tag and the thread should be made of weather resistant material. The installation and removal of tags is restricted to authorized employees/ contractors and they shall only install or remove. All Tags shall be dated and signed in the designated places prior to installation. Special instructions covering operation of equipment is to be noted on "Caution Tag".

7.43.7. HSE Signs should cover the following, such as:

a. Signs for clearances from electrical equipment and hazardous material.

b. Signs for minimum horizontal and vertical clearance for overhead Low/High Tension lines from house/building.

c. Signs for dangerous operation.

d. Signs for the explosion hazard.
e. Signs for high noise restricted areas.
f. Signs for locations/ places.
g. Signs for smoking areas.
h. Signs for access/ egress/ exit.
i. Signs for HSE instructions for employees/ contractors/ visitors.
j. Signs for personal protective equipment and its location.
k. Signs for useful knots.
l. Signs for strengths and weight of material.
m. Signs for safe working load of lifting equipment.
n. Signs for safe working load of ropes.
o. Signs for safe working of cranes.
p. Signs for operation and maintenance Information.
q. Signs for fire or emergency equipment and its location.
r. Road/ Traffic signs.
s. Signs for Pedestrians.
t. Signs for allowable factor of scaffolding safety.
u. Signs for Permit to Work (PTW) requirements.
v. Signs for employees/ contractors/ visitor's motivation.
w. Signs for Preventive Maintenance and Inspection schedules.
x. Signs for conversion tables.
y. Others required as per equipment manufacturer or engineering standards, etc.

7.44. Housekeeping

7.44.1. The company shall maintain a reasonably good housekeeping throughout the site. Inappropriate housekeeping will increase chances of incidents and fires, etc.

7.44.2. As general guidelines:

a. Stored materials secured and limited at the height to prevent falling of objects.

b. Materials/ files shall not be stored on top of the steel cabinet, which is more than four (04) feet tall.

c. All cabinets and racks over four feet tall should be secured so that they cannot fall over.

d. Cabinets and racks over four feet tall should be bolted together or fastened to the wall or floor.

e. Heavy material should be stored on the lowest shelves in the cabinet or rack because they will stabilize the cabinet or rack. Store heavy items on shelves below waist height level. Light or infrequently used items should be stored on the higher shelves.

f. Provide "rack protector" or "rack guard" or "angle iron stopper" in the warehouse and storage facility to protect the storage racks/shelves getting hit by the forklift while loading and unloading of material.

g. Drums shall be stacked on pallets or skids with no more than two (2) drums high.

h. Bookcases, filing cabinets, drawers, shelves, racks, storage cabinets and office materials should be organized properly and closed.

i. Keep all official files in filing cabinet. Remove/ dispose-off, those files, papers, and materials regularly, which are not required.

j. Display “Uniformly Distributed Load” caution sign on each storage rack in accordance to reference drawing/manufacturer of the storage rack.

k. The workplace should be clean, layout orderly, properly arranged/ secured cables and no trips, falls or sharp edges.

l. No electrical switches or receptacles cracked or broken.

m. No frayed or damaged electrical cord or substandard extension cable is in use.

n. Place all waste at designated places (bins or refused containers).

o. Exit paths should be clear, unobstructed and properly lit for any emergency.

p. Store PPE properly at designated clean places.

q. Facilities/ equipment not in use should be frequently checked by area in-charge for any potential hazard.

7.45. Health & Hygienic Facilities

7.45.1. The company shall arrange occupational health assessments for selected employees and contractors who are usually involved in hazardous tasks related to their job roles, at least once every three years to ensure that individuals are medically, physically, and mentally fit for their assigned responsibilities at electrical network, grids, substations, and other electrical infrastructures. Line management shall ensure the implementation of occupational health assessment recommendations for any individual as prescribed by a medical physician and maintain records of these actions in the employee file. Employees or contractor staff who are declared medically unfit in an occupational health assessment or by a medical physician may be reassigned to administrative or light duties if they are unable to perform hazardous tasks related to their job roles for which they were specifically hired.

7.45.2. Occupational health assessments should include the following tests:

a. General health assessment to review medical history, physical examination, and assessment of vital signs.

b. Screening for visual acuity, color vision, and hearing tests.

c. Respiratory function tests to evaluate lung function, especially if the job involves exposure to respiratory hazards.

d. General blood tests for parameters such as blood count, liver function, kidney function, and cholesterol levels.

e. Assessment of musculoskeletal health, including range of motion, strength, and any existing injuries or conditions that might affect work performance.

f. Psychological assessment for mental health or stress resilience.

g. Depending on the nature of the work, additional tests or evaluations may require.

7.45.3. Employees and contractor staff should be up-to-date on vaccinations relevant to their occupation, including but not limited to tetanus, hepatitis B, influenza, or any others mandated by law.

7.45.4. The Transmission and Distribution Companies shall maintain the strength of line and grid cadre staff in accordance with set criteria and yardsticks, ensuring the

transmission and distribution system are reliable and safe for the community. Line and grid cadre staff shall only be assigned the technical role for which they were specifically hired, and not to be transferred/posted to unrelated office or administrative duties.

7.45.5. Line and grid cadre staff shall not be assigned to critical tasks beyond the long working hours specified in the Factories Act 1934 and labor regulations.

7.45.6. As a line staff requires good balance, strength, stamina, and coordination, especially when working at heights and electrical infrastructures. Therefore, the maximum working age limit for a lineman should be 55 years considering natural aging. After reaching this age threshold, reassigning linemen to administrative or lighter duties helps utilize their vast experience and knowledge.

7.45.7. The company shall provide hygienic facilities to protect employees/ contractor's health and the environment. The company shall also provide an adequate supply of potable drinking water and well hygienic canteen, mess or cafeteria.

7.45.8. Sufficient individually accessible toilet and handwashing facilities shall be provided for employees, contractors and visitors, kept clean and maintained in good working order.

7.45.9. The company shall consider workplace ergonomics, illumination, ventilation, temperature, heat stress, noise, dust and fume in its hygiene plan.

7.45.10. The company should evaluate and ensure suitable natural or artificial lighting at the site to maintain safe working conditions and clear visibility for tasks. The lighting should be uniformly spread and of an intensity that prevents discoloration, shadowing, and strong glare.

No.	Location	Required illumination[1] Level / Lighting Power Density[2]		
		Lux	Foot Candles	LPD (W/ft^2)
1.	Office/Study Room	500	46	0.8
2.	Meeting Room	300	28	0.5
3.	Training Room	500	46	0.8
4.	Auditorium Seating Area	200 to 100	19 to 9	0.3 to 0.2
5.	Auditorium Stage Area	500 to 300	46 to 28	0.8 to 0.5
6.	Laboratory	750 to 500	70 to 46	1.2 to 0.8
7.	Control Room	750 to 500	70 to 46	1.2 to 0.8

8.	Workshop	750 to 500	70 to 46	1.2 to 0.8
9.	Electrical Substation Outdoor	37 to 22	3.4 to 2	0.06 to 0.03
10.	Electrical Substation Indoor	170 to 110	16 to 10	0.3 to 0.17
11.	Electrical Switch Yard Outdoor	37 to 22	3.4 to 2	0.06 to 0.03
12.	Emergency lighting	54 to 32	5 to 3	0.08 to 0.05
13.	Loading/Unloading Area	200 to 100	19 to 9	0.3 to 0.2
14.	Indoor Parking Areas	75 to 50	7 to 5	0.12 to 0.08
15.	Outdoor Parking Areas	20 to 10	2 to 1	0.03 to 0.02
16.	Plant Area (Indoor Equipment)	370 to 220	34 to 20	0.6 to 0.3
17.	Plant Area (Outdoor Equipment)	90 to 54	8 to 5	0.14 to 0.08
18.	Dining Room	300	28	0.5
19.	Kitchen	750 to 500	70 to 46	1.2 to 0.8
20.	Corridor/Lobby	200	19	0.3
21.	Stairway	200	19	0.3
22.	Store	440 to 260	41 to 24	0.7 to 0.4
23.	Warehouse Indoor	90 to 54	8 to 5	0.14 to 0.08
24.	Warehouse outdoor	9 to 5.4	0.8 to 0.5	0.01 to 0.008
25.	Indoor Recreational Area	500 to 300	46 to 28	0.8 to 0.5
26.	Outdoor Recreational Area	500 to 200	46 to 19	0.8 to 0.3
27.	Reception Area, Hallway, Washroom	200	19	0.3
28.	Road Heavy Traffic	30 to 15	2.8 to 1.4	0.05 to 0.03
29.	Road Light Traffic	10 to 5	0.9 to 0.5	0.02 to 0.008
30.	Pedestrian Routes	10 to 5	0.9 to 0.5	0.02 to 0.008
31.	Fence/ Perimeter	10 to 5	0.9 to 0.5	0.02 to 0.008

Note-1: Illuminance: This is the measure of the amount of light (luminous flux) falling onto a surface. It's measured in lux (in the metric system) or foot-candles (in the imperial system).

Note-2: Lighting Power Density (LPD): This refers to the amount of electrical power used for lighting per square foot of a space or building. It's often measured in watts per square foot (W/ft^2).

7.46. Fire Prevention

7.46.1. The company shall provide and maintain adequate, easily accessible fire protection equipment on the job site. The company should consult with the Civil Defense department or Pakistan Engineering Council approved fire safety engineer/vendor for advice on selection, installation, testing, and commissioning of a fire suppression system. The company shall arrange and provide firefighting training to personnel to be familiar with fire suppression system and its use.

7.46.2. The company shall establish, maintain and record monthly visual inspections of in-service fire protection equipment to check; if it is in correct location, whether access is unobstructed and clearly visible, to check equipment gauges, signs of leakage, corrosion or physical damage and check seals are unbroken and up to date inspection tag is fitted.

7.46.3. The company shall establish and maintain how to notify the concerned parties of the isolation or outage of Fixed Fire Protection systems, Fire Water Network, and Fire Detection and Alarm Systems. Company shall ensure the mitigation plan (control measures) is provided and implemented in case of isolation or outage of fire protection system.

7.46.4. The company shall take steps to prevent ignition of materials, lubricants, and fuels used at site.

7.46.5. Electrical equipment should be checked regularly for defects.

7.46.6. Smoking shall be permitted only in designated areas.

7.46.7. Welding equipment, heating appliances and other open flames or hot surfaces should be segregated from combustible materials.

7.46.8. Proper bonding and grounding techniques shall be used for any operation where static electricity could become an ignition source.

7.46.9. Gasoline and diesel-powered equipment should only be used in well-ventilated areas. Exhaust pipes should be kept away from combustible materials.

7.47. First-aid Facilities

7.47.1. The company shall provide a qualified paramedic nurse and an ambulance at site of construction, turnaround, rehabilitation, decommissioning, and demolition to meet the emergency situation whenever work force exceeds fifty (50) persons.

7.47.2. First aid supplies shall be available nearby all work areas.

7.47.3. The company shall arrange First Aid training for selected employees/ contractors and arrange inspection and refilling of in-service First Aid Kit on monthly basis during the first week of each month.

7.47.4. First Aid training should cover following aspects:

- Cardiopulmonary resuscitation (CPR).
- Nose bleeding.
- Physical/ Electric shock.
- Sun/ Heat stroke.
- Fainting/ Dizziness/ Food poisoning.
- Fractures (broken bones).
- Transportation/ shifting of the victims (to health facilities and nearby hospitals).
- Wounds.
- Splinters or foreign substances in the body.
- Animal/ Snake bites.
- Burns (thermal, electrical & chemical).
- Eye injuries.
- Sprains/ strains.
- Bruises/ Allergies.
- Frostbite.
- Heimlich maneuver

7.48. Emergency Management

7.48.1. The company shall establish, implement, and maintain an Emergency Management system to reduce losses caused by emergencies and to ensure that effective incident readiness and response plan are in place in order to limit and control the consequences of incident. This will be achieved by identifying, preventing, planning and training to respond to any event that could occur in company facilities that

requires the activation of emergency response. The Emergency Management System is applicable to incidents and emergencies that may take place within company physical boundaries and operational area. The Emergency Management System should describe the mitigation, preparation, response and recovery of emergency scenarios, specific to company operations, risks and uncontrolled significant aspects.

7.48.2. The company shall conduct post-disaster assessment/patrolling after major events like fire, explosion, floods, earthquake/ tsunami, land sliding, or collapse of building/structures to verify the integrity of their infrastructures.

7.48.3. The company shall ensure that necessary emergency items are available at site.

7.48.4. The company shall provide, inspect and maintain in good working order adequate firefighting and rescue equipment. Designated employees/ contractors shall be properly trained in the use of firefighting and rescue equipment.

7.48.5. The company Incident that is expected to extend beyond the perimeter fence of the facility and could likely affect the surrounding industries and community OR external incident such as gas leak, toxic liquid spill and potentially large fire that occurs outside the boundary of company facility and could endanger the safety and health of employees/contractors or could cause damage to company property OR an Incident escalated which cannot be managed by the available onsite resources and beyond the competency level of company personnel, need immediate assistance from external Emergency Support Services and from the neighboring industries.

7.48.6. If external Emergency Support Services are not available to the degree needed by the site, then the company must develop internal resources and internal response capability according to the risk, i.e., fire, medical, rescue, and spill response capabilities.

7.48.7. Only trained employees/ contractors having appropriate PPE should respond to an incident. Emergency preparedness and response plan shall be followed. Others employees/ contractors shall follow the evacuation plan.

7.48.8. Employees/ contractors in the affected area shall stop the assigned job in a safe manner (conduct emergency shutdown/ isolation of operating equipment), if it is safe to do so as per SOP/ work instruction. They shall evacuate the affected area and proceed to the designated safe assembly point. All employees/ contractors

after hearing emergency alarm should gather at the assembly point and wait for further instructions.

7.48.9. Assembly area should be at least 100 feet away from Operational Area, Building, Warehouse, Substation or Hazardous Area.

7.48.10. Windsocks should be provided at suitable locations in the plant to assist in a safe escape of personnel in case of an emergency.

7.48.11. The company should incorporate color-coded triage tags or bracelets into their emergency management system to categorize and prioritize patients during a mass casualty incident or disaster. These colored tags or bracelets are attached to the patient's clothing or in a visible location on their body. Patients with higher triage tags, such as Red tag (Immediate) are given transportation and treatment priority. Patients should be reassessed regularly to ensure that their condition has not deteriorated or improved, and tags may be adjusted accordingly. These triage codes help healthcare providers and hospitals identify patients' conditions promptly, and allocate resources accordingly based on the severity of injuries or illnesses.

a. Red Tag (Immediate): Patient with critical condition and require immediate medical attention.

b. Yellow Tag (Delayed): Patient with significant injuries or illnesses that are not immediately life-threatening but still require prompt medical care within 6 hours.

c. Green Tag (Minor): Patient with minor injuries or illnesses who can walk and do not require immediate attention. These individuals can often wait for medical care, allowing resources to be allocated to more critical cases first.

d. Black Tag (Dead/Expectant): Patient is dead or have injuries or illnesses that are incompatible with life. These patients are beyond medical help, and resources should be focused on those with a higher chance of survival.

7.48.12. Employees or contractor’s employee shall stop and turn off their vehicle/ heavy equipment and park in a safe manner till the “All Clear” is announced. Don’t block exit routes and routes for emergency responders.

7.48.13. The company shall ensure that a mock drill (announced/ unannounced) of the on-site Emergency Management System is conducted at least once every three (03)

months.

7.48.14. Drill should be arranged in collaboration with local authorities.

7.48.15. A tabletop drill should be conducted one day prior to the mock drill to ensure thorough preparation for a mock drill to identify any potential gaps, test coordination, communication, decision-making processes, and familiarize with respective roles and responsibilities during an emergency. During the tabletop drill, the drill commander and internal responders should gather around a table in the meeting room. They should exercise/act on their responsibilities related to the mock drill scenario, starting from the emergency activation till its termination.

7.48.16. The record of each drill shall be retained and preserved by company for period of one fiscal year.

7.48.17. The results of the drill should be evaluated and when needed used for improvement of the emergency preparations.

7.48.18. The following potential incident scenarios as applicable, but not limited to, should be considered in Emergency Management System:

- Incident Reporting,
- Evacuation Plan,
- Medical Incident,
- Missing person/persons Search/Rescue,
- Fire/ Explosion Incident (residential area, building, plants, cable, transformer yard, generating stations, coal handling/ conveyor system, etc.), The fire scenarios could involve flammable liquids/ gases, pressurized cylinder, electrical appliance, coal, wood, paper, cloth, rubber, plastics and vehicle.
- Spill/ Release Incident,
- Collapse of lifting appliances and transport equipment,
- Utility failure Incident,
- Fire water network failure/ Use of backup equipment,
- Elevator Failure
- Rescue from height/stack,
- Earthquake/ Tsunami,

- Land sliding,
- Flood,
- Collapse of building or structures,
- Confined Space Rescue,
- Elevated/ Pole Top Rescue,
- Insulated Electrical Rescue Hook to separate the victim from the electrical source,
- Resources,
- External Emergency Support Services,
- Blood borne and radiological pathogens decontamination,
- Cleanup and General Decontamination.

7.49. Incident Management

7.49.1. Incidents are the results, consequences or outcomes of the HSE management system failure, either not available or not implemented. An effective HSE management system will provide layers of protection against significant incidents or damages.

7.49.2. The company employees and contractors shall report all incidents, on-the-job injuries, or occupational illnesses, no matter how slight, immediately to their supervisor or in-charge. The supervisor or in-charge shall ensure that the injured employee receives proper first aid or medical treatment.

7.49.3. When an accident is reported to the company, or known through media, occurring at any of its sites, within its service territory, under its jurisdiction, or electrical accidents occurring inside consumer premises, the company shall immediately report the accident to NEPRA Regional Office via email, phone, WhatsApp, or SMS including email at hse@nepra.org.pk.

7.49.4. The company shall upload all work-related and public-related accidents to the NEPRA Data Exchange Portal within 24 hours when directed by NEPRA when it's determined by the Regional Office fact-finding report that it's employee work-related or public-related accident.

7.49.5. Employee work-related accidents may involve fatalities or injuries to employees, contract workers, or daily wage workers that occurs at the official work during duty

hours or while on an official assignment. These accidents include, but are not limited to, electrocution, arc flashes, falls from heights, hazardous spills/releases, fires, explosions, falls of conductors, structural collapse such as building, towers or poles, animal bites, mob attacks or any other similar accident. This also includes vehicle accidents while commuting to or from work in case of an emergency call out. However, animal attack cases will be handled and investigated by HSE team and mob attack cases will be handled and investigated by security/law enforcement teams.

7.49.6. Employees, contract employee or daily wages worker NON-Work-Related accident is defined as any fatality, injury or accident that occur outside of duty hours such as symptoms caused by outside factors, eating, drinking and preparing one's own food, self-medication, suicide, vehicle accident in parking lot or while commuting to or from the office, personal tasks, home-related injuries, sports-related injuries, recreational activities like hiking, climbing, biking, and swimming, and animal or mob attacks outside of duty hours.

7.49.7. Any criminal, intentional, or willful act by an employee, contract employee or daily wages worker shall not be considered safety accident. Instead, it should be treated as a security incident and addressed in collaboration with the appropriate law enforcement agencies.

7.49.8. Public-related accidents could involve fatalities or injuries to the general public directly caused by the network owner's operations or infrastructure. These accidents include, but are not limited to, electrocution, arc flashes, hazardous spills/releases, fires, explosions, falls of conductors, structural collapses such as building, towers or poles, and any other similar incidents including electrical accidents at consumer premises involving network owner's operations or infrastructure. Theft of network owner assets, illegal connections (such as direct hooking or kunda connections), unauthorized interference with the network owner's operations or infrastructure, or accidents occurring inside consumer premises that do not involve the network owner's infrastructure, are not considered public-related accidents.

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7.49.9. Consumer premises electrical accidents NOT involving network owner's operations or infrastructure include, but are not limited to:

7.49.9.1. Accidents resulting from faulty wiring within the consumer's premises.

7.49.9.2. Accidents resulting from faulty electrical appliances and equipment at the

consumer's premises.

7.49.9.3. Accidents caused by overloading of circuits by consumers by plugging too many devices into a single outlet or circuit, leading to overheating and potential fires.

7.49.9.4. Electrical shocks or electrocution due to the lack of proper earthing for appliances and equipment at the consumer's premises.

7.49.9.5. Electrocution of individuals attempting to perform electrical repairs or installations at consumer's premises.

7.49.9.6. Accidents where electrical devices come into contact with water at consumer's premises, leading to shocks or short circuits.

7.49.9.7. Accidents arising from consumers' frayed, cracked, or damaged electrical cords and plugs.

7.49.9.8. Accidents resulting from misuse of extension cords by consumers.

7.49.10. Consumer premises electrical accidents involving network owner's operations or infrastructure include, but are not limited to:

7.49.10.1. Accidents resulting from defective or malfunctioning energy meters.

7.49.10.2. Accidents caused by sudden spikes in voltage originating from the supply lines.

7.49.10.3. Accidents occurring when HT power lines fall and come into contact with consumer service cables or consumer premises, leading to electrocution or fires.

7.49.10.4. Accidents caused by mistakes or negligence during maintenance or repair work.

7.49.10.5. Accidents stemming from incorrect installation of network owner's owned equipment, such as poles, wires, or transformers.

7.49.11. Normal wear and tear, sudden or unforeseen failures, losses, damage or breakdowns of machinery, equipment or their parts shall not be considered safety incidents. However, such a technical incident should be handled and investigated by a technical team consisting of personnel from maintenance, process, asset integrity, reliability or by the manufacturer.

7.49.12. A power outage or blackout is not categorized as a safety incident unless it leads to

fire, property damage, loss of primary containment, or similar significant consequences.

7.49.13. The top management of the network owner shall personally visit the residence of the deceased to offer moral support to the bereaved family in the event of a work-related or public-related fatality accident directly caused by network owner's operations or infrastructure. This provision excludes accidents involving theft of network owner assets, illegal connections/direct hooking (kunda connections), unauthorized illegal interference with the network owner's operations or infrastructure, or accidents occurring inside consumer premises due to consumer.

7.49.14. All incidents, including significant near misses, of the company, its contractors, subcontractors, suppliers, bulk power consumers, single point supply consumers and other system users shall be promptly investigated by the company to identify the actual root cause. When root cause is properly fixed, will prevent recurrence or significantly reduce the likelihood of the similar incident in future. The investigation report of any particular incident shall be submitted to NEPRA, as and when directed. However, in the case of investigating critical near-miss incidents, the company is required to conduct the investigation according to their own relevant procedures or SOP.

7.49.15. The company shall upload soft copy of final investigation report at NEPRA Data Exchange Portal within thirty (30) working days from the date of the incident. If more than thirty (30) working days are required, the company shall provide proper detailed justification with required days for completion of investigation report to obtain NEPRA approval.

7.49.16. The company shall secure and preserve all relevant evidences/ documents including victim(s) all PPE for investigation process.

7.49.17. The original complete investigation report shall be retained and preserved at company safety office file for plant/ equipment life cycle and shall include the following:

a. Incident Title,

b. Executive Summary,

c. Table of Contents,

d. Letter of appointment of the investigation leader,

e. List of investigation team members (For Team Investigations),

f. Definitions (if required),

g. Description of site facility,

h. Operations/ activity prior to the incident,

i. Description of the incident,

j. Sequence/ timeline of events prior to incident, during, and immediately after the incident,

k. Incident direct cost,

l. Emergency response description,

m. Root cause analysis or equivalent methodology for main root and primary contributing causes,

n. Corrective and preventive recommendations with responsible person assigned for each recommendation for implementation along with reasonable/ achievable completion date,

o. Annexures (organized as Annexure 1, 2, 3…) to include copies of relevant and available evidences/documents with investigation report such as direct evidences are incident sketches, site photographs, weather report and site condition, illumination and ventilation status, attendance record, victim PPE information and photographs, tools or equipment information and photographs, vehicles information and photographs, victim health and sleep information, interview statements of injured victim/witness with contact details, CCTV record, voice record, CNIC of injured/involved person (IP), victim company employment card, driving license, lab tests, medical report/death certificate/postmortems report, procurement record, work order, plan, isolation record, relevant work permits, excavation approval, method statement, JSA, risk assessment, HAZOP record, technical report, protection/tripping record at Grid Station, functional test and bypass record of critical protection devices, training record of victim and involved crew, total experience of victim and involved crew, victim and involved crew qualification and certification, inspection/patrolling record, preventive maintenance (PM) record, break-down maintenance record, fixed earthing/ grounding continuity & resistance test report/record, transformers load balancing register/data,

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maintenance or contractor procedure, contractor pre-qualifications record, equipment manual, equipment/pole tag number, specification sheet, heavy equipment inspection and certification, daily inspection checklist, operator and rigger certifications, lifting plan, scaffolding plan, scaffold supervisor and inspector certifications, operation SOP, logbook, field checklist, duty roster, shift changeover, process and instrument drawing (P&ID)/process flow diagrams (PFD)/single line diagram, design data, applicable standards, download fault record from relay, distributed control system (DCS) trend, computer log, environmental data, fugitive emission data, MOC record, pre start-up safety review record, layout plan, notification, notice, office orders, schedule, agreement, contract, communication record, FIR/police report, compensation proof, fire station report, etc.

7.49.18. Medical Report, Death Certificate or Postmortems Report shall clearly written the reason of the death.

7.49.19. During an explosion, the resultant blast wave can potentially harm the inner ear of individuals present within the explosion zone. The explosion pressure is typically 35 to 100 mbarg. Therefore, an audiometric testing and appropriate medical treatment should be immediately considered for people working in the explosion zone at the time of the accident.

7.49.20. Accident report recommendations should be specific, measurable, attainable, realistic, and time-bound (SMART), targeting elimination, substitution, engineering controls, administrative controls, and PPE, based on facts/ evidences (proof of event), not on beliefs. The recommendation should add value to HSE or operations otherwise no need to initiate recommendations.

7.49.21. Recommendation shall be clear with full information and if the action is related to any equipment, equipment number shall be included in the recommendation statement.

7.49.22. Responsible person for recommendation implementation should be as low as Resident Engineer, Executive Engineer, Sub-Divisional Officer or Manager. Each recommendation shall have clear completion/ target date.

7.49.23. Recommendation shall not be considered implemented till it is not verified physically by company HSE Manager/ Representative or local authorities.

7.49.24. The company shall communicate critical/ high learning value incident as lesson

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learned with the potential for serious consequences to relevant personnel, interested parties or general public.

7.49.25. NEPRA may reject submitted investigation report, if less than adequate. The company shall re-investigate the incident and re-submit the investigation report again to NEPRA within fifteen (15) working days.

7.49.26. Evaluate the physical and mental fitness of an employee before allowing him/her to resume work after an injury or illness to ensure his/her physical and mental health and fitness for the job.

7.49.27. If an employee of the company has a work-related accident, excluding natural death, while adhering to the company's Safety Rules, SOP's, Procedures, Work Instructions and utilizing required Personal Protective Equipment (PPE) and Permit to Work (PTW), the next of kin/bereaved family shall be eligible and entitled to receive complete fatal or injury compensation including employment benefits, even if the victim joined the company on the same day, irrespective of victim employment status within the company as permanent, contractual, or temporary employment.

7.49.28. If an employee of the company engages in an unsafe action, violation, or intentional/criminal act results in fatality or injury to another employee, contract employee or daily wages worker at the workplace, the next of kin/bereaved family shall be eligible and entitled to receive complete fatal or injury compensation including employment benefits, even if the victim reported at the company on same day.

7.49.29. If an employee of the company has a work-related accident due to breaches of the company's Safety Rules, SOPs, Procedures, or Work Instructions, working without PPE, lacking authorization or PTW, using a mobile phone during work, being under the influence of drugs, or engaging in an intentional, criminal, or suicidal act, in such cases, the next of kin/bereaved family should not be eligible for compensation for fatalities or injuries, but should be entitled to employment benefits. The fatality or injury of the employee must be a direct result of his/her unsafe actions or violation of the company's established Safety Rules, SOP, or Work Instruction that are clearly stated, acknowledged, and consistently enforced by the company. The company shall maintain a record in the personal files of regular employees, contract employees or daily wages workers, acknowledging their orientation/training on Safety Rules, SOPs, Procedures, and Work Instructions.

7.49.30. Whenever the company is held or proven responsible for the fatality or injury (bodily harm) of a contract employee, daily wages worker or member of the public due to negligence, violations of safety regulations/protocols, SOPs, supervisory oversights, unsafe conditions, faulty equipment or infrastructure that the company is responsible and accountable for planning, establishing, implementing, maintaining, monitoring, and communicating (internally and externally) in accordance with the license term and condition for safe, efficient and reliable operations including but not limited to construction, operation, maintenance, turnaround, rehabilitation, standby, decommissioning, mothballing, and demolition jobs, the company shall provide the "Diyat" value. Pakistan's Diyat (Blood Money) law as a predetermined amount of compensation to be paid to the legal heirs, announced annually by the Federal Government, in pursuance of sub-section (2) of Section 323 of the Pakistan Penal Code (Act XLV of 1860). The company shall also provide employment/job for an adult family member (next-of-kin) in order to reduce the financial constraints on the bereaved family that has lost its bread earner, with the condition that the next-of-kin must possess the eligibility for the post.

7.49.31. Next of kin is defined as a person's closest living relatives/legal heirs through blood, marriage, or legal relationships. The line of inheritance begins with the victim's spouse (widow or widower). If the victim's spouse (widow or widower) is not available, then the victim's legitimate children (son and unmarried daughter). If both spouse (widow or widower) and legitimate children are not available, then the victim's legitimate parents. When the victim has no spouse (widow), legitimate children, or legitimate parents, and he or she is the sole bread earner for his or her unmarried legitimate sisters and brothers, then his or her sisters and brothers shall be considered next of kin. If the determination of the next of kin remains unclear, then a 'Succession Certificate' should be obtained from the court of law to definitively establish the next of kin and legal heirs.

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7.49.32. In the event of an accident involving animal/property loss to the general public for which company is held responsible, the legal heir/owner of the animal/property shall be compensated for the loss". Therefore, company shall determine the quantum of compensation for loss of property or animal based on the following general guidelines.

a. The valuation of animal may be based on breed, age, health, productivity (like milk yield in the case of dairy animals), and market demand. The valuation of

property may involve an assessment by a recognized property valuer. They will consider the market value of the property, its age, depreciation, potential future value, and any other relevant factors. Compensation can vary depending on whether the property or animal is completely lost, partially damaged, or temporarily unusable. In the case of partial damage, the cost of repairs or medical treatment can be considered. If the property or animal was a source of income, such as rental property or a working animal, compensation might include loss of earnings or potential earnings. This requires a projection of the earnings that would have been made if the loss hadn't occurred. Accidental expenses could include costs, such as veterinary fees for injured animals, transportation costs, or costs to secure alternative accommodation or facilities. If the property or animal is insured, the insurance company will have its own process for determining compensation, which might involve adjusters or valuers. Often, the final amount of compensation is reached through negotiation between the aggrieved party and the party responsible for the damage (or their insurance company). Both sides might present their valuations and justifications, arriving at a mutually acceptable figure. If parties cannot agree, and the matter is taken to civil court, the court will consider all evidence, possibly expert testimonies, and determine the appropriate compensation based on the principles of fairness, equity, and established legal standards.

7.49.33. In the event of a fatality, injury, or loss of property or animals due to the negligence or fault of a Power Company, bereaved family may seek compensation through legal means. Here are the guidelines to follow:

a. In case of fatality or injury, seek immediate medical attention. Obtain medical report, death certificate or postmortems report that clearly state the cause of the injury or death.

b. Report the incident promptly to the nearest police station and Power Company as quickly as possible. Ensure that it is documented and that you have a receiving/record of your complaint number.

c. Collect evidence related to the incident, which may include taking photographs/video of the scene, any damaged equipment, medical reports, and details from eyewitnesses.

d. If it is confirmed that the injuries or fatality resulted from the Power Company's actions or negligence, file a formal complaint with the National Electric Power

Regulatory Authority (NEPRA) at its Regional Offices or Main Office in Islamabad.

e. If the aggrieved party, next of kin or bereaved family are dissatisfied with the compensation offered by the Power Company or have not received compensation, they retain the right to pursue further claims in the civil court for the fatality, injury, or loss of property or animals.

f. File a lawsuit against the Power Company to get compensation. Such claims for fatality or injury can consider factors including the deceased's age, average life expectancy, medical expenses, current salary, lost wages, potential salary growth, pension arrangements, loss of educational opportunities for the deceased's children, and the potential impact on those children's future marital prospects. In case involving the loss of property or animals, the valuation of animal may be based on breed, age, health, productivity (like milk yield in the case of dairy animals), and market demand. The valuation of property may involve an assessment by a recognized property valuer. They will consider the market value of the property, its age, depreciation, potential future value, and any other relevant factors.

g. If a judgment is awarded in bereaved family favor, they may need to take legal steps to enforce the judgment and ensure that they receive the compensation as ordered by the court.

7.50. Monthly HSE Performance Reporting

7.50.1. Use Annexure-3 for Monthly Performance Reporting, which shall include all accidents as reported to the company, or known through media, occurring at any of company sites, within its service territory, under its jurisdiction, or electrical accidents occurring inside consumer premises.

7.50.2. Include investigation, inquiry reports, or preliminary occurrence reports of fatal accidents, in the monthly HSE performance report and send to NEPRA at the email address 'hse@nepra.org.pk' by the 10th of each month for the previous month's HSE performance. The original year-end report shall be retained and preserved by the company for three (03) years.

7.50.3. NEPRA emphasizes accuracy and transparency when reporting monthly Occupational Health, Safety & Environment (HSE) performance report.

7.51. Internal HSE Audits

7.51.1. The company should establish a mechanism for Internal HSE Audit in order to assess the implementation of HSE Management System, this Code requirements, adhere to national and provincial legal requirements, to prevent the non-conformities, and to detect and correct unsafe practices/ conditions and deficiencies.

7.51.2. NEPRA will monitor the company HSE performance and initiatives and will randomly verify as deem necessary, through site evaluation (planned or unplanned).

7.51.3. The company shall allow NEPRA nominated representative(s) at their sites to conduct evaluation for HSE Management System.

7.51.4. The company shall spare and nominate their HSE personnel when requested by NEPRA for evaluation of another company HSE Management System to identify gaps and provide site specific recommendations for improvement. The company shall cover all expense of their HSE personnel while on business travel/ assignment for evaluation.

7.52. HSE Performance Evaluation

7.52.1. The purpose of the Occupational Health, Safety, and Environment (HSE) performance evaluation is to assess company's performance with the aim to promote continual improvement.

7.52.2. The company shall submit all supporting documents, record and evidences of last fiscal year for the HSE Performance Evaluation at NEPRA HSE Data Exchange Portal in HSE Performance Evaluation Form or as directed by NEPRA by July 31st of each year.

7.52.3. The company shall compile the title page, table of contents, and approval page into a single PDF file for each section of each category. The PDF file title should include the respective category number and section number. Do not include blank forms in the PDF file.

7.52.4. Additional documents, record and evidences shall be submitted to NEPRA within given time, as and when directed.

7.52.5. Based on the NEPRA evaluation, companies should be categorized as outstanding, good, fair, poor, or unsatisfactory, and subsequently, a performance report should be issued if directed by NEPRA Authority. The report is intended for general information of HSE performance for the purpose of further improvement.

7.52.6. Companies who were responsible for work-related or public fatal accidents during the evaluation year, they shall receive a zero point in category # 19. For all other categories, points shall be given to them based on the submitted data to measure their continual improvement in other categories.

7.52.7. The higher ranking in the report does not guarantee that a company's actual performance in the field is the same as stipulated in the report. In actual, it could be either more effective or worse. Despite the higher ranking, this does not mean that the company is free from individual accidents or lapses.

7.52.8. NEPRA will assign category points from 1 to 5 using the following scale to rate the HSE performance of company.

Points	1	2	3	4	5
Points x Assessment Categories	1 x 20	2 x 20	3 x 20	4 x 20	5 x 20
Percentage	20	40	60	80	100
Category	Unsatisfactory 1 - 20	Poor 21 - 40	Fair 41 - 60	Good 61 - 80	Outstanding 81 - 100

8. Annexures

Annexure-1: HSE Team Contact Details Form

Annexure-2: Incident Reporting Form

Annexure-3: Monthly HSE Performance Report Form

Annexure-4: HSE Performance Evaluation Form

Annexure-1: HSE Team Contact Details Form

Company Name		**Company Category***	
NEPRA License No.		**CEO Name**	
CEO Mobile Contact No.		**CEO Email Address**	
Corporate Address			

No.	HSE Team Name(s)	Job Title	Site/Plant Address	Office Contact No.	Mobile Contact No.	WhatsApp Contact No.	Email Address	Remarks
1.								
2.								
3.								
4.								
5.								

Role	Name	Mobile Number	Signature	Date
Prepared by (Licensee Representative)				

* Category: Generation, Transmission or Distribution

Note-1: The company shall upload HSE staff contact details at NEPRA's Data Exchange Portal as mentioned in Annexure-1 "HSE Team Contact Details" within seven (07) working days. The company representative shall also upload the revised and updated contact list, in case of new recruitment, transfer, resigned or in case of HSE organization change. Avoid use of abbreviations.

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Annexure-2: Incident Reporting Form

(Required within 24 hours)

Company Name			NEPRA License No.		
Incident Location			Date of Incident		
Time of Incident			Incident No.		
License Category (Tick mark which is applicable)	Generation ☐		Transmission ☐	Distribution ☐	
Incident Category (Tick mark which is applicable)	Employee ☐		Contractor ☐	General Public ☐	
	Environmental Violation ☐		Occupational Health Violation ☐	☐	

Incident Type	Fatality ☐		Public Injury ☐	Public Illness ☐	
	Lost Time ☐		Restricted Duty ☐	Medical Treatment ☐	
	First Aid ☐		Fire ☐	Release/ Spilled ☐	
	Crane/ Heavy Equipment ☐		Property Damage ☐		
Total Victim(s)					
Name of Victim-1			CNIC No.		
Gender			Age		
Fathers Name			Occupation of Victim		
Victim Relative Contact No.			Extent of Injury		
Name of Victim-2			CNIC No.		
Gender			Age		
Fathers Name			Occupation of Victim		
Victim Relative Contact No.			Extent of Injury		
Witness-1 Name			Witness-1 Contact No		
Witness-2 Name			Witness-2 Contact No		
Witness-3 Name			Witness-3 Contact No		
Which PPE used by victim(s) at the time of incident:					

Incident Description. (Write down how incident happened, beginning with the normal job activity that led to the incident. Put the events with timing, as far as possible, in the order they happened)

Action Taken	Yes	No
Is the local police informed/ FIR lodged?		
Is necessary evidence immediately gathered from the incident site for investigation process?		
Is an investigation team formed by company to determine root cause?		
Responsibility is fixed upon (with justification).		
What corrective actions are implemented immediately at incident site?		
What preventive actions are implemented at other sites to avoid reoccurrence of similar Incident?		
Is this incident reported within 24 hours? (Yes/No). If No, provide justification.		

Role	Name	Mobile Number	Signature
Prepared by (Company Representative)			

Note-1: When an accident is reported to the company, or known through media, occurring at any of company sites, within its service territory, under its jurisdiction, or electrical accidents occurring inside consumer premises, the company shall immediately report the accident to NEPRA Regional Office via email. phone, WhatsApp, or SMS including email at hse@nepra.org.pk.

Note-2: The company shall upload all work-related and public-related accidents to the NEPRA Data Exchange Portal within 24 hours when directed by NEPRA when it's determined by the Regional Office fact-finding report that it's work-related or public-related accident.

Note-3: In the case of multiple fatalities or injuries resulting from a single incident, the incident reporting shall include details of all victims, as well as the names and contact numbers of all witnesses.

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Annexure-3: Monthly HSE Performance Report Form

Company Name	
NEPRA License No.	
License Category*	
Address	
Reporting Month	

No.	Classification / Type	Total Last Month		Total Year To Date	
		Accident	Fatality	Accident	Fatality
1.	General Public				
2.	Employee				
3.	Contractor				
No.	**Classification / Type**	**Accident**	**Injury/ Illness**	**Accident**	**Injury/ Illness**
4.	General Public				
5.	Lost Time Injury or occupational Illness of Employee				
6.	Lost Time Injury or occupational Illness of Contractor				
7.	Restricted Duty Injury or occupational Illness of Employee				
8.	Restricted Duty Injury or occupational Illness of Contractor				
9.	Medical Treatment Injury or occupational Illness of Employee				
10.	Medical Treatment Injury or occupational Illness of Contractor				
11.	First Aid Injury or occupational Illness of Employee.				
12.	First Aid Injury or occupational Illness of Contractor				
No.	**Classification / Type**	**Total Last Month**		**Total Year To Date**	
13.	Fire Incident at company property.				
14.	Property damage Incident of company.				
15.	Crane/Heavy Equipment Incident related to company.				
16.	Major Environmental Violation related with Emissions, Liquid Effluent and Solid Waste, etc.				
17.	Major Occupational Health Violation related with company Workplace Ventilation/Temperature, Drinking Water, Noise, Illumination, Heat Stress, etc.				

Role	Name	Mobile Number	Signature
Prepared by (Company Representative)			

*License Category: Generation, Transmission or Distribution

Note-1: The Monthly HSE Performance Report shall include all accidents as reported to the company, or known through media, occurring at any of company sites, within its service territory, under its jurisdiction, or electrical accidents occurring inside consumer premises.

Note-2: Include investigation, inquiry reports, or preliminary occurrence reports of fatal accidents, in the monthly HSE performance report and send to NEPRA at the email address 'hse@nepra.org.pk' by the 10th of each month.

Annexure-4: HSE Performance Evaluation Form

Company Name		**Company Category** (Generation, Transmission or Distribution)	
NEPRA License No.		**Corporate Address**	
Evaluation Year		**Submitted Date**	

Note: The company shall compile all subcategories into a single PDF file. This PDF file should include a table of contents and page numbers for each subcategory. The title of the PDF file should contain the respective category serial number for immediate reference.

Sr. No.	Category	Points
1.	**HSE Management System** Approved HSE Management System/ Manual is available in compliance to Power Safety Code?	

Subcategory	Attached	Not Available	Not Applicable
1. HSE Management System/ Manual (Attach title page, table of contents, and approval page only)	☐	☐	☐
2. Legal Compliance Register (Attach approved register)	☐	☐	☐
3. Third Party HSE Audit Report (Attach report)	☐	☐	☐
4. Management System Certification (Attach certificates)	☐	☐	☐
5. Insurance Risk Engineers Report for plants and facilities. (Attach report)	☐	☐	☐
6. HSE initiatives and improvements made by the company during the evaluation year.	☐	☐	☐

2.	**HSE Management Team** Is the company providing a sufficient number of qualified HSE staff at the site for supervision, who can effectively oversee their employees and contractors?	

Subcategory	Attached	Not Available	Not Applicable
1. HSE team details/organogram is maintained. (Attach approved organogram)	☐	☐	☐
2. HSE team training certifications or training attendance record. (Attach certificates or record)	☐	☐	☐

	3. Independent and functional HSE Directorate/Department. (Attach order)	☐	☐	☐	
	4. HSE Team responsibilities and duties clearly defined. (Attach approved responsibilities and duties document)	☐	☐	☐	
	5. Total number of company direct employees. (Attach Admin/HR Letter)	☐	☐	☐	
3.	**Hazards/ Aspect Identification and Risk/ Impact Assessments** The approved Hazards/Aspect Identification and Risk/Impact Assessment is available, and the recommended measures have been implemented.				
	Subcategory	Attached	Not Available	Not Applicable	
	1. Risk/ Impact Assessment Procedure/ SOP. (Attach title page, table of contents, and approval page only)	☐	☐	☐	
	2. Risk/Impact Assessment Worksheet.	☐	☐	☐	
	3. List of Risk/ Impact Assessment recommendation(s). (Attach List)	☐	☐	☐	
	4. Risk/ Impact Assessment recommendations implementation action plan/ evidences/ photographs. (Attach approved action plan and evidences)	☐	☐	☐	
4.	**HSE Meeting** The approved periodic plan for HSE Meetings is available, and these meetings are conducted at the top management level. Additionally, detailed minutes of each meeting are documented.				
	Subcategory	Attached	Not Available	Not Applicable	
	1. HSE Meeting procedure/SOP. (Attach title page, table of contents, and approval page only)	☐	☐	☐	
	2. HSE Meeting approved periodic plan. (Attach plan)	☐	☐	☐	
	3. Top management attended.	☐	☐	☐	
	4. Minutes of meeting available. (Attach MOM)	☐	☐	☐	
	5. Recommendations implementation action plan/evidences/photographs.	☐	☐	☐	

	(Attach approved action plan and evidences)				
5.	**Job Specific Training** The approved training need assessment and periodic plan for Job Skills Competency Training are available. Does the company provide job skills competency training for various roles such as Electrical Technician, Assistant Lineman, Lineman, Line Superintendent, Heavy Equipment Operators, Riggers, Scaffold Supervisors, etc.?				
	Subcategory	Attached	Not Available	Not Applicable	
	1. Training procedure/SOP. (Attach title page, table of contents, and approval page only)	☐	☐	☐	
	2. Job specific training need assessment. (Attach approved TNA)	☐	☐	☐	
	3. Job specific training approved periodic plan. (Attach approved plan)	☐	☐	☐	
	4. Sample of in-house training attendance record or third party training certifications. (Attach record or certificates)	☐	☐	☐	
6.	**HSE Awareness Training** The approved training need assessment and periodic plan are available for HSE awareness trainings, covering topics such as Work Permit Issuer & Receiver, Electrical Safety, Isolation, PPE/T&P, Fire Watch, Standby man, Fire Prevention, First Aid, Working at Height, Confined Space, Emergency and Rescue Operation, etc. Have all essential employees/contractors attended the necessary HSE awareness trainings, including new employees/contractors, before conducting their activities?				
	Subcategory	Attached	Not Available	Not Applicable	
	1. Training procedure/SOP. (Attach title page, table of contents, and approval page only)	☐	☐	☐	
	2. HSE training need assessment. (Attach approved TNA)	☐	☐	☐	
	3. HSE training approved periodic plan. (Attach approved plan)	☐	☐	☐	
	4. Sample of in-house training attendance record or third party training certifications. (Attach record or certificates)	☐	☐	☐	
	5. Annual public awareness campaign periodic plan and photographs.	☐	☐	☐	

	(Attach approved plan and evidences)				

7. **Management HSE Walk-through/ Site Tours**

The approved periodic plan for Top Management HSE Walk-through/Site Tours is available and executed as planned. Does the top management actively participate in these tours, and are corrective actions taken when necessary?

Subcategory	Attached	Not Available	Not Applicable
1. HSE Walk-through/Site Tours approved periodic plan. (Attach approval plan)	☐	☐	☐
2. Top Management participation.	☐	☐	☐
3. List of observation/findings. (Attach List)	☐	☐	☐
4. Evidences or photographs of open/ close status of observation/findings. (Attach evidences)	☐	☐	☐

8. **Asset Integrity Management**

The approved Preventive Maintenance periodic plan is readily available and actively implemented. The approved list of safety critical protection devices, instrumentation, interlocks, protection relays, breakers, controls, safety relief valves, F&G detection system, software and components are available and their in-service testing/inspection is carried out according to the periodic plan, either by the government authority or inspection agencies registered with Pakistan Standards and Quality Control Authority.

Subcategory	Attached	Not Available	Not Applicable
1. Asset Integrity Management procedure/SOP. (Attach title page, table of contents, and approval page only)	☐	☐	☐
2. Preventive maintenance/ schedule outage approved periodic plan. (Attach plan)	☐	☐	☐
3. Preventive maintenance execution record. (Attach record)	☐	☐	☐
4. Safety critical protection devices approved list. (Attach approved list)	☐	☐	☐
5. Sample of safety critical protection devices testing (in-house or third party). (Attach evidence, certificate or report)	☐	☐	☐
6. In-house or third party integrity inspection/certificate of stability of	☐	☐	☐

	civil and steel structure of plant platforms, workshop, warehouses, normal office buildings, porta cabins and blast resistant buildings at intervals of 3 to 5 years. (Attach evidence, certificate or report)				
	7. In-service Boiler Inspection Certificate. (Attach certificate)	☐	☐	☐	
	8. In-house or third party inspection of in-service electrical installation of plant, workshop, warehouses, normal office buildings and blast resistant buildings at intervals of 3 to 5 years. (Attach evidence, certificate or report)	☐	☐	☐	
9.	**Management of Change (MOC)** The Management of Change (MOC) program is available and actively implemented. MOC Committee/Team is present to review and approve any permanent or temporary changes, modifications, additions, or deletions that are considered "Not In Kind".				
	Subcategory	Attached	Not Available	Not Applicable	
	1. Management of Change (MOC) procedure/SOP. (Attach title page, table of contents, and approval page only)	☐	☐	☐	
	2. MOC Committee/team notification. (Attach evidence or order)	☐	☐	☐	
	3. List of MOCs. (Attach list)	☐	☐	☐	
	4. Sample of complete MOC. (Attach evidence)	☐	☐	☐	
10.	**Personal Protective Equipment (PPE)** Personal Protective Equipment (PPE) approved list is available with material description. Adequate amount of PPE inventory is maintained by company at each site?				
	Subcategory	Attached	Not Available	Not Applicable	
	1. PPE procedure/SOP. (Attach title page, table of contents, and approval page only)	☐	☐	☐	
	2. PPE need assessment sheet/report. (Attach approved sheet/report)	☐	☐	☐	
	3. Stock and non-stock PPE approved list is available with material	☐	☐	☐	

	description. (Attach approved list)				
	4. Stock PPE inventory is maintained. (Attach evidence)	☐	☐	☐	
	5. Certificates/ photographs of in-service special PPE inspections conducted either in-house or by a third party. (Attach evidence, certificate or photographs)	☐	☐	☐	
11.	**Electrical and Mechanical Energy Isolation** The electrical and mechanical isolation system is available and fully operational.				
	Subcategory	Attached	Not Available	Not Applicable	
	1. Electrical and Mechanical Energy Isolation procedure/SOP. (Attach title page, table of contents, and approval page only)	☐	☐	☐	
	2. Electrical Isolation lockout sample evidences/ photographs. (Attach photographs)	☐	☐	☐	
	3. Mechanical Isolation chain off sample evidences/ photographs. (Attach photographs)	☐	☐	☐	
	4. Sample evidences/ photographs of mechanical isolation by valve closure with use of rated blinds at Inlet and Outlet Or removal of pipe spool with the use of blind flange Or double block & bleed with use of blind Or removal of mechanical couplings. (Attach photographs)	☐	☐	☐	
	5. Blind list or the blind register or marked P&ID reflecting numbered locations of blinds. (Attach evidence or list)	☐	☐	☐	
12.	**Permit to Work** The Permit to Work system is available and has been effectively implemented. Additionally, the list of approved authorized Permit to Work Issuers & Receivers is readily available.				
	Subcategory	Attached	Not Available	Not Applicable	
	1. Permit to Work procedure/SOP. (Attach title page, table of contents, and approval page only)	☐	☐	☐	
	2. Authorized Permit to Work Issuer & Receiver List.	☐	☐	☐	

	(Attach approved list)				
	3. Training or refresher training for authorized Permit to Work Issuer & Receiver. (Attach evidence, attendance sheet or record)	☐	☐	☐	
	4. Sample of executed Permit to Work. (Attach executed Permit to Work sample)	☐	☐	☐	

13. **Heavy Equipment, Machinery, Power Driven Tools and other Handheld Portable Equipment's**

The approved list of Tools & Plants (T&P), heavy equipment, machinery, power-driven tools, and other handheld portable equipment is available, and regular in-service inspections are conducted with inspection tags installed. Moreover, the list of Heavy Equipment Operators and Riggers is readily available, and all personnel in these roles are trained and certified.

Subcategory	Attached	Not Available	Not Applicable
1. Relevant procedure/SOP. (Attach title page, table of contents, and approval page only)	☐	☐	☐
2. Tools & Plants (T&P) approved list. (Attach approved list)	☐	☐	☐
3. Heavy equipment approved list. (Attach approved list)	☐	☐	☐
4. Samples of in-house or third party inspection certification or tags of in-service heavy equipment. (Attach evidence or certificate)	☐	☐	☐
5. Heavy Equipment Operator and Rigger list. (Attach list)	☐	☐	☐
6. Heavy Equipment Operator and Rigger training, License and certification. (Attach training record, license and certificate)	☐	☐	☐

14. **Internal HSE Audit**

The Internal HSE Audit system is available, and audits are planned and conducted during the evaluation year.

Subcategory	Attached	Not Available	Not Applicable
1. Internal HSE Audit procedure/SOP. (Attach title page, table of contents, and approval page only)	☐	☐	☐
2. Internal HSE Audit periodic plan.	☐	☐	☐
3. Sample of internal HSE audit report/	☐	☐	☐

	outcomes/ email. (Attach report/ outcomes/ email report)				
	4. Audit non-compliance open/close status. (Attach evidence)	☐	☐	☐	

15. **Health & Hygienic Facilities**

Health & Hygienic facilities are provided and regularly maintained. Occupational health assessments are conducted for selected employees/contractors who are typically engaged in critical tasks, based on their job roles, to ensure that individuals are medically, physically, and mentally fit for their assigned responsibilities.

Subcategory	Attached	Not Available	Not Applicable
1. Health & Hygienic procedure/SOP. (Attach title page, table of contents, and approval page only)	☐	☐	☐
2. Occupational health assessment record. (Attach evidence, record or certificate)	☐	☐	☐
3. Evidences/ photographs of hygienic facilities such as potable drinking water at workplace, hygienic canteen, mess or cafeteria. (Attach evidence or photographs)	☐	☐	☐
4. In-house or third party assessment conducted with correction evidences for workplace ergonomics, illumination, ventilation, temperature, heat stress, noise, dust and fume. (Attach evidences, results or reports)	☐	☐	☐
5. Annual Inspection Report by Labour Welfare Office. (Attach evidence)	☐	☐	☐
6. Employees' Social Security Registration Certificate for private sector organizations. (Attach evidence)	☐	☐	☐
7. Employees' Old-Age Benefits Institution (EOBI) Registration Certificate for private sector organizations. (Attach evidence)	☐	☐	☐

16. **Environmental Management System**

The Environmental Management System is available and being implemented as per the established guidelines.

Subcategory	Attached	Not Available	Not Applicable
1. Environmental management procedure/ SOP. (Attach title page, table of contents, and approval page only)	☐	☐	☐
2. An Initial Environmental Examination (IEE) or Environmental Impact Assessment (EIA) study in compliance with EPA. (Attach report)	☐	☐	☐
3. Site Specific Environmental and Social Management Plan for Sustainable Development. (Attach plan)	☐	☐	☐
4. Construction or operational phase EPA No Objection Certificate (NOC)/Approval Letter. (Attach letter)	☐	☐	☐
5. Pollution control measures related to air quality, water quality, land quality, irrigation, noise levels, radiation emission, waste management, ozone depletion control and natural resource conservation. (Attach results)	☐	☐	☐
6. Initiatives to obtain carbon credit certificates for the reduction of carbon dioxide and other greenhouse gas emissions aim to achieve emissions reduction targets, reduce carbon footprints, and mitigate the impacts of climate change. (Attach evidence)	☐	☐	☐
7. Environmental monitoring report submitted to relevant Environmental Protection Agency. (Attach evidence or report)	☐	☐	☐
8. Petroleum storage License/ Approval. (Attach evidence)	☐	☐	☐
9. Sulfuric acid or other regulated chemical utilization License/ Approval. (Attach evidence)	☐	☐	☐
10. Industrial waste reduction evidence. (Attach evidence)	☐	☐	☐
11. Industrial waste reuse evidence.	☐	☐	☐

	12. Industrial waste recycling evidence. (Attach evidence)	☐	☐	☐	
	13. Industrial waste not intended for recycling or reuse is treated and/or disposed of via approved contractors or facilities within one hundred and eighty (180) days of the waste being generated. (Attach evidence)	☐	☐	☐	

17. **Fire Prevention & First Aid Facilities**

Fire prevention equipment's are present and regularly maintained at each site. First aid facilities/boxes are also available and well-maintained at each site. In-service inspection and refilling of first aid supplies are carried out on a monthly basis during the first week of each month.

Subcategory	Attached	Not Available	Not Applicable
1. Fire Prevention & First Aid procedure/SOP. (Attach title page, table of contents, and approval page only)	☐	☐	☐
2. In-house or third party inspection records of in-service fire protection equipment. (Attach evidence)	☐	☐	☐
3. Evidences of First aid facilities/ boxes. (Attach evidence or photographs)	☐	☐	☐
4. Evidences of inspection and refilling of in-service first aid facilities/boxes. (Attach evidence)	☐	☐	☐
5. Evidences of in-service ambulance inspection. (Attach evidence or photographs)	☐	☐	☐
6. List of dedicated First Aid providers at site. (Attach approved list)	☐	☐	☐

18. **Emergency Management**

The Emergency Management system is available and actively implemented. Both announced and unannounced emergency drills are planned and regularly conducted.

Subcategory	Attached	Not Available	Not Applicable
1. Emergency Management procedure /SOP. (Attach title page, table of contents, and approval page only)	☐	☐	☐
2. Announced and unannounced emergency drills periodic plan.	☐	☐	☐

	(Attach approved plan)				
	3. Announced and unannounced emergency drills sample evidences/ photographs. (Attach evidence or photographs)	☐	☐	☐	
	4. Drill recommendations action plan/ implementation evidences/ photographs. (Attach evidence or photographs)	☐	☐	☐	

19. **Incident Reporting and Investigation**

The Incident Reporting & Investigation system is available and functioning effectively. Does the company adhere to NEPRA's emergency reporting instructions for incidents? Furthermore, has the company conducted thorough investigations for all incidents, including near-misses?

The total work-related fatal accidents during the evaluation year:

The total public fatal accidents during the evaluation year for which the company was responsible:

Subcategory	Attached	Not Available	Not Applicable
1. Incident Reporting & Investigation procedure/SOP. (Attach title page, table of contents, and approval page only)	☐	☐	☐
2. Sample injury accident investigation report. (Attach report)	☐	☐	☐
3. Sample critical near-miss investigation report. (Attach report)	☐	☐	☐
4. Investigation report recommendations action plan/ implementation evidences/ photographs. (Attach evidence or photographs)	☐	☐	☐

20. **Response to NEPRA Recommendations/ Corrective Actions**

Have all recommendations/corrective actions directed by NEPRA been fully implemented within the specified period of time?

Subcategory	Attached	Not Available	Not Applicable
1. The action plan/evidence of the implementation of the recommendations provided by NEPRA within the specified timeframe. (Attach evidence)	☐	☐	☐

Total Performance Evaluation Points:	

Role	Name	Mobile Number	Signature	Date
Prepared by (Company Representative)