



LIFE AND FIRE SAFETY RISK ASSESSMENT

**Electricity Distribution Efficiency
Improvement Project (EDEIP)**

**PESHAWAR ELECTRIC SUPPLY COMPANY
(PESCO)**



**SAFETY
FIRST**



**FIRE
AWARENESS**



**EMERGENCY
PREPAREDNESS**



**RISK
PREVENTION**

2026



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1.0 EXECUTIVE SUMMARY

This report presents an in-depth Life and Fire Safety Assessment conducted for PESCO under the World Bank-financed Electricity Distribution Efficiency Improvement Project (EDEIP).

The **objective** of this assessment was to undertake an in-depth life and fire safety assessment for identification of fire risks and hazards, reduce or eliminate risks that might cause a fire as well as identify person (both employees and public) who are at risk of being hurt or killed. Furthermore, the purpose of this study was also to ensure regulatory compliance with Building Code of Pakistan Fire Safety Provisions 2016 as well as NEPRA Safety Code 2024 for Licensees.

The **scope** of the assessment carried out, included evaluation of fire risks across PESCO's Transmission, Grids and administrative operations. Key deficiencies were identified in fire detection systems, suppression infrastructure, emergency preparedness, training, and regulatory compliance.

The approach focused on proactive risk reduction through fire prevention and first-responder readiness rather than reactive firefighting.

The risk assessment was carried out by adopting a two tiered approach. The first tier was the risk assessment of conditions which are currently existing (unsafe conditions) in areas where the project has to be carried out and the second tier was the assessment of risks (unsafe acts) which will arise when the tasks required by the project are to be performed. The OHS Management Plan is a result of combining both tiers of risk assessment and suggesting their mitigation measures.

2.0 SCOPE

The overall scope of the Life and Fire Safety Risk Assessment carried out, is the evaluation of fire risks across PESCO's entire Transmission, Grids and administrative operations. Identification of Key deficiencies in fire detection systems, suppression infrastructure, emergency preparedness, training, and regulatory compliance.

The scope further included the Life and Fire Risk Assessment of following sub-projects being carried out under the EDEIP:

- a. 11-kilovolt (kV) capacitor banks
- b. Extension of nine grid stations
- c. Augmentation of nine grid stations
- d. Installation of transformer monitoring system
- e. Installation of 65,000 smart meters
- f. Aerial bundle cable (ABC) for 60 feeders.

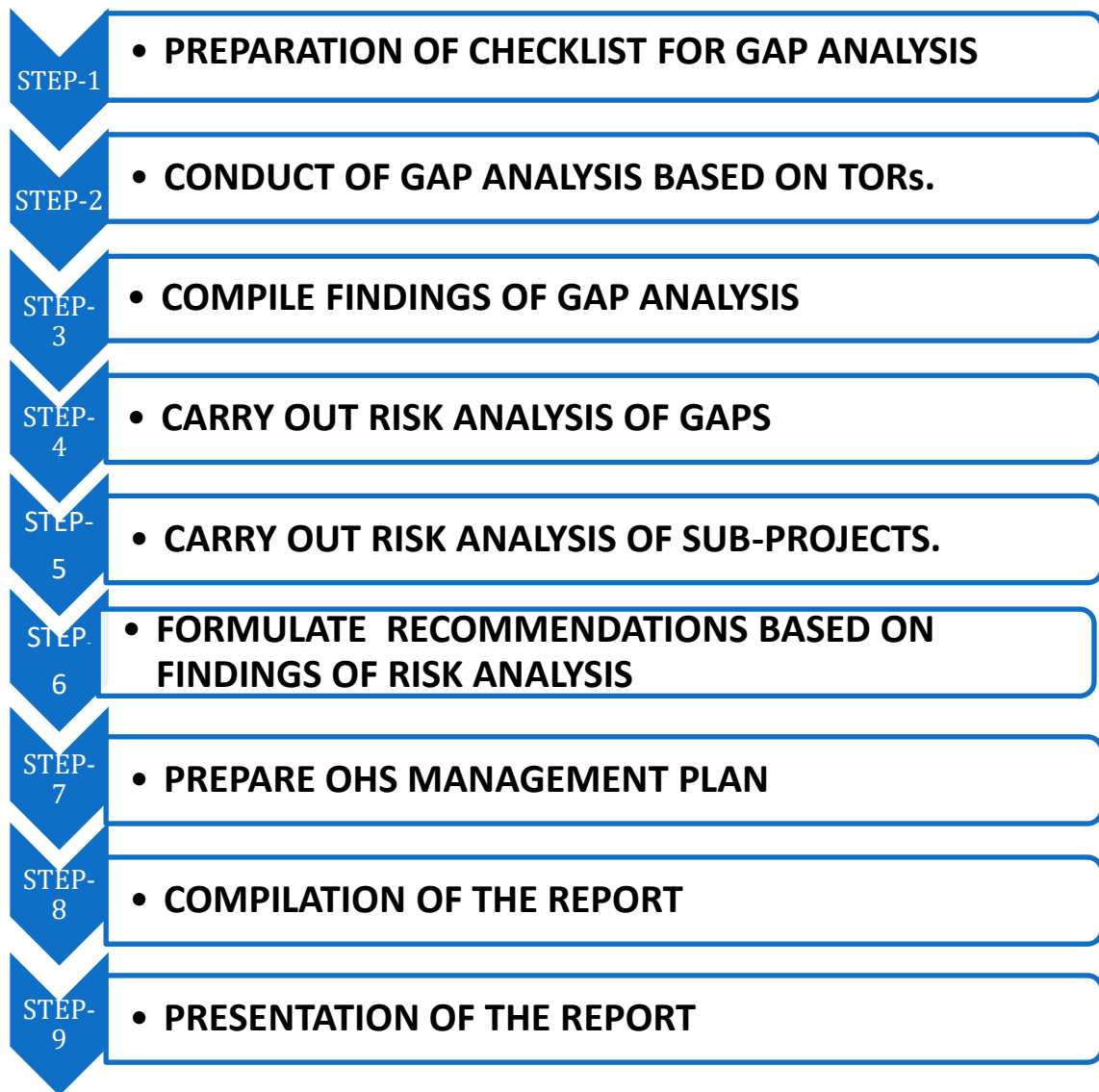
3.0 DELIVERABLES

The deliverables have been derived from the TORs and consist of a comprehensive report comprising of the following:

- a. **Executive summary** – briefly explains the essence of the assessment report.
- b. **Fire safety observations** – the mainstay of the fire risk assessment including identification of hazards, adequacy of existing fire safety measures including detection, alarm systems, emergency lightening, fire doors, emergency exits and emergency response etc.
- c. **Identify strengths and areas for continual improvement** – they are extracted from the Gap Analysis and form a part of the Action Plan.
- d. **Prioritized recommendations** - The recommendations have been prioritized as “Short Term”, “Medium Term” and “Long Term” and incorporated in the Action Plan.
- e. **Action plan** – comprises of practical actions and recommendations which when implemented shall not only ensure the safety of employees, public and assets but make certain as well as regulatory compliance within the scope of the Project.

4.0 METHODOLOGY

An eight steps risk based approach has been adopted to address the requirements given in the Terms of Reference.



5.0 CHECKLIST FOR GAP ANALYSIS

5.1 The bench marks for formulating the Gap Analysis Checklist were prepared keeping in mind the requirements mentioned in the TORs in following areas and other standards. The result of Gap Analysis are given in Annex B.

- a. Fire Safety Planning and Leadership Commitment
- b. Existing Firefighting System
- c. Safety of Building and Utilities
- d. Risk Assessment and Mitigation
- e. Training and capacity building
- f. Regulatory compliance with existing Life and fire safety regulations
- g. NEPRA Power Safety Code 2024 for Licensees.
- h. Building Code of Pakistan Fire Safety Provisions 2016

5.2 Following is a brief about each benchmark:

a. Benchmark 1: Fire Safety Planning and Leadership Commitment

- i. **Description:** This benchmark assesses the extent to which fire and life safety is integrated into organizational leadership, governance, and strategic planning. It ensures that fire safety is prioritized at the highest level and embedded in the organization's structure and culture.

ii. Checklist items

- o A formal, documented Fire and Life Safety Policy is endorsed by senior management.
- o Roles and responsibilities related to fire safety are clearly defined and communicated across the organization.

- A qualified Fire Safety Officer or Coordinator is appointed and empowered to implement and monitor safety measures.
- Leadership conducts regular reviews of fire safety performance, including incident trends and compliance status.
- Adequate budgetary provisions are allocated specifically for fire safety infrastructure, training, and system maintenance.

b. Benchmark 2: Fire Detection Systems

- i. **Description:** Check the presence of fully functional fire detection systems, including smoke detectors, heat detectors, and alarm systems.
- ii. **Checklist Items:**
 - Smoke detectors are installed in all critical areas.
 - Heat detectors are installed in high-temperature areas.
 - Alarm systems are integrated with fire detection systems and are audible throughout the facility.
 - Regular testing and maintenance schedules for all detection and alarm systems are documented and followed.
 - Are Heat detectors installed in areas where smoke detectors might trigger false alarms due to dust, humidity, or fumes
 - Is there any mitigation plan (Control measures) provided and implemented in case of isolation or outage of fire protection system i.e. (fire detection & alarm system).

c. Benchmark 3: Fire Suppression Systems

- i. **Description:** Verify that adequate fire suppression systems such as sprinklers, fire extinguishers, and hydrants are in place and operational.

ii. Checklist Items:

- Sprinkler systems are installed and cover all high-risk areas.
- Fire extinguishers are available, clearly marked, and regularly inspected.
- Fire hydrants are strategically located, accessible, and maintained.
- Automatic fire suppression systems (e.g., gas suppression systems) are operational in critical equipment areas.
- Is there any mitigation plan (Control measures) provided and implemented in case of isolation or outage of Fire suppression systems

d. Benchmark 4: Fire-Resistant Building Materials

- i. **Description:** Ensure the use of fire-resistant materials in the construction of buildings and critical infrastructure.

ii. Checklist Items:

- Fire-resistant doors and windows are installed in all key areas.
- Fire walls are constructed to contain potential fires and prevent spread.
- Is the roof structure fire resistant for structural stability and control spread of fire?
- Building materials meet national fire safety standards.

e. Benchmark 5: Emergency Exits and Evacuation Routes

- i. **Description:** Confirm that emergency exits and evacuation routes are well-marked, unobstructed, and sufficient for the number of occupants.

ii. Checklist Items:

- Emergency exits are clearly marked with illuminated signs.
- Evacuation routes are free of obstructions and clearly mapped out.
- Sufficient number of exits to accommodate all employees and visitors.
- Regular evacuation drills are conducted and documented.
- Emergency exits open in the direction of path of exit travel.

f. Benchmark 6: Fire Safety Training and Drills

- i. **Description:** Verify that all employees receive regular fire safety training and participate in emergency evacuation drills.
- ii. **Checklist Items:**
 - Fire safety training programs are conducted regularly for all employees.
 - Specialized training for handling electrical fires is provided to relevant personnel.
 - Records of training sessions and attendance are maintained.
 - Regular fire drills are conducted, and their effectiveness is reviewed.

g. Benchmark 7: Maintenance and Inspection Schedules

- i. **Description:** Ensure that all fire safety equipment and systems are regularly inspected and maintained.
- ii. **Checklist Items:**
 - Maintenance schedules for fire detection, alarm, and suppression systems are documented and adhered to.
 - Routine inspections of fire safety equipment are conducted.

- Logs of maintenance and inspections are maintained.

h. Benchmark 8: Emergency Response Plans

- i. **Description:** Confirm that comprehensive emergency response plans are in place and regularly updated.
- ii. **Checklist Items:**
 - Emergency response plans are documented and accessible to all employees.
 - Plans include detailed procedures for fire incidents, including evacuation, communication, and coordination with external emergency services.
 - Regular reviews and updates of emergency response plans are conducted.
 - Do emergency exit doors open in the direction of the path of exit travel

i. Benchmark 9: Risk Assessment and Mitigation

- i. **Description:** Conduct thorough risk assessments to identify potential fire hazards and implement mitigation measures.
- ii. **Checklist Items:**
 - Regular risk assessments are conducted for all areas.
 - Identified fire hazards are documented and prioritized for mitigation.
 - Mitigation measures are implemented and tracked for effectiveness.

j. Benchmark 10: Coordination with External Emergency Services

- i. **Explanation:** Ensure effective coordination with local fire departments and emergency services.
- ii. **Checklist Items:**
 - Regular communication and coordination with local fire departments.
 - Joint drills and training exercises with external emergency services.
 - Updated contact information for local fire departments and emergency services.

k. Benchmark 11: Documentation and Reporting

- i. **Explanation:** Maintain comprehensive documentation and reporting of all fire safety activities.
- ii. **Checklist Items:**
 - Fire safety policies and procedures are documented and easily accessible.
 - Reports of fire incidents, drills, training sessions, and maintenance activities are maintained.

6.0 FIRE SAFETY PLANNING AND LEADERSHIP COMMITMENT

6.1 TOR Requirement

In line with the Terms of Reference (TORs) for this Life and Fire Safety (L&FS) assessment, the first area of review concerns PESCO's fire safety planning and the extent of leadership commitment to ensure protection of employees, contractors, the public, and critical assets. Strong leadership commitment is fundamental to embedding a proactive safety culture. Without it, fire safety provisions may exist only on paper and remain ineffective in practice. This section therefore examines PESCO's fire safety policy, organizational structure, leadership engagement, resource allocation, and the effectiveness of communication and implementation of fire safety measures. The review is conducted with reference to the NEPRA Power Safety Code for Licensees (2024), the Building Code of Pakistan – Fire Safety Provisions (2016), as well as international standards such as NFPA 101: Life Safety Code and the IFC Environmental, Health, and Safety (EHS) Guidelines for Electric Power Transmission and Distribution.

6.2 Fire Safety Policy

- a. PESCO has a documented "Fire Prevention and Protection Policy" (Chapter 7 of Safety Manual), endorsed by management and accessible on the PESCO website. It is integrated into PESCO's overall safety policy and covers both employees and contractors.
- b. However, the policy lacks explicit linkage of fire safety objectives to corporate KPIs or departmental performance monitoring.
- c. Best practice requires fire safety policy to:
 - Explicitly state a zero-tolerance approach to unsafe acts leading to fire hazards.
 - Assign direct accountability to top management.

- Commit resources for fire prevention, detection, and response.
- d. Current review indicates that the fire safety component is treated as part of general occupational safety, rather than a dedicated fire safety framework, limiting its visibility and effectiveness.

6.3 Organizational Structure and Leadership Commitment

- a. Fire safety responsibilities within PESCO are diffused across departments without a clearly designated Fire Safety Officer or a dedicated Fire Safety Section.
- b. Leadership oversight is primarily reactive, responding to inspections or incidents, rather than proactively leading risk reduction.
- c. International benchmarks (e.g., NFPA 600: Standard on Facility Fire Brigades) emphasize the appointment of dedicated fire safety leadership and establishment of internal fire safety committees.
- d. Absence of a fire safety champion at senior level reduces accountability and weakens adoption of a strong fire safety culture.

6.4 Resource Allocation

- a. Fire safety budgets are embedded within general OHS allocations, limiting visibility and focus.
- b. Critical requirements such as automatic fire detection, suppression systems, and emergency lighting are inconsistently funded.
- c. Resources must be proportionate to the scale of operations and hazards.
- d. The assessment finds that current resource allocation is insufficient to meet these requirements across PESCO facilities.

6.5 Communication and Awareness

- a. Policy is accessible online and distributed in the Safety Manual. Safety slogans and notices are displayed at some facilities.
- b. Structured awareness sessions on fire safety are infrequent and lack systematic documentation.

- c. Best practice in LFS require repeated communication, leadership visibility in drills, and integration of fire safety into toolbox talks.
- d. Absence of continuous reinforcement leads to limited staff ownership of fire safety practices.

6.6 Adequacy of Existing Fire Safety Measures

- a. Existing arrangements include portable fire extinguishers and sand buckets only. Deficiencies observed include:
 - Outdated or missing extinguishers in control rooms.
 - No centralized fire detection or monitoring system.
 - Inadequate emergency lighting and signage.
 - Fire doors either absent or poorly maintained.
- b. While some measures exist, they fall short of compliance with national codes and international performance standards.

6.7 Analysis & Recommendations

a. Strengths Observed

- PESCO has a documented Fire Safety Policy, endorsed by management.
- Basic firefighting measures (extinguishers, sand buckets) are in place.
- Policy is publicly accessible and included in NEPRA-approved Safety Manual.

b. Opportunities for Improvement

- Fire Safety Policy does not articulate clear fire safety objectives, responsibilities, and measurable indicators.
- Fire safety responsibilities are spread across departments, with no designated Fire Safety Officer or committee.
- Fire safety budgets are not stipulated, diluting importance of critical measures.

- Communication methods rely on passive tools; interactive engagement is limited.
- Existing fire safety measures (extinguishers, alarms, lighting) require significant upgrades to meet the requirements in Building Code of Pakistan 2016 and NFPA 101.

c. Recommendations

- Policy Enhancement – Update Fire Safety Policy to include fire-specific objectives, measurable KPIs, and define clear accountability lines.
- Leadership Commitment – Appoint a dedicated Fire Safety Officer, reporting to senior management, supported by a cross-department Fire Safety Committee.
- Resource Allocation – Establish a dedicated fire safety budget covering: detection, suppression, alarms, emergency lighting, and fire doors.
- Capacity Building – Introduce structured awareness campaigns (leadership-led drills, toolbox fire topics, fire safety week, certification trainings).
- Compliance Upgrades – Launch a phased program to install/upgrade detection, alarm, and evacuation systems in high-risk facilities, ensuring compliance with NEPRA PSC, Building Code, NFPA and IFC guidelines.

7.0 IN DEPTH EVALUATION OF FIRE HAZARDS AND SOURCES OF IGNITION

7.1 TOR Requirement

As per the TORs, this section evaluates potential fire hazards and sources of ignition across PESCO facilities. The review must identify risks that could cause or spread fires through convection, conduction, or radiation, as well as ignition sources, fuels, unsafe acts/conditions, and risks associated with flammable material storage. It must also document people at risk and reasons for their vulnerability. The assessment is steered by NEPRA Power Safety Code 2024 and the Building Code of Pakistan – Fire Safety Provisions 2016 and international standards such as NFPA 850 (Fire Protection for Electrical Utility Installations).

7.2 Current Practices

- a. Insufficient housekeeping was observed in control rooms, offices, material stores and yards, including accumulation of waste materials near offices, panels and trenches.
- b. Loose wiring, broken sockets, and open joints increase risk of short circuits and overheating.
- c. Oil drums and transformer oil were stored unsafely, with no bunds or containment pits.
- d. Vegetation around transformers and yards was unmanaged, creating fuel for ignition.
- e. Unsafe practices such as smoking in restricted areas, use of temporary wiring, and cooking in control rooms, Head Office corridors were noted.

- f. No structured hazard mapping or risk register was available to track fire ignition sources.

7.3 Gaps & Impacts

- a. Unsafe conditions (worn-out cables, open joints, vegetation) create multiple ignition points.
- b. Improper storage of oil and flammable materials and lack of timely garbage disposal increases potential fire load.
- c. Unsafe acts and omissions by staff/contractors raise incident probability.
- d. Shift workers, contractors, and maintenance crews are most at risk due to direct exposure and lack of training.

7.4 Strengths

- a. Awareness exists among some senior staff regarding high-risk activities.
- b. Some substations have restricted smoking signage in place.
- c. Management's commitment to implement a Safety Management System.

7.5 Opportunities for Improvement

- a. Establish formal hazard identification and mapping procedures.
- b. Create safe storage practices for flammables and enforce PPE use.
- c. Improve vegetation control and maintenance around substations.

7.6 Recommendations

- a. Develop a Fire Hazard Register identifying ignition sources, fuels, and unsafe acts at each site.
- b. Enforce strict housekeeping standards (no storage near panels, no cooking in control rooms).
- c. Provide proper containment for transformer oil and drums.
- d. Train staff/contractors on ignition controls and ban unsafe practices (smoking, temporary wiring).
- e. Introduce systematic vegetation and pest control around all substations.

8.0 EMERGENCY PLANNING IMPLEMENTATION

8.1 TOR Requirement

The TORs require evaluation of fire emergency planning, evacuation procedures, incident response, and linkage of emergency protective measures with fire risk assessments. The review also covers post-incident recovery, inspection arrangements, and adequacy of workplace fire inspections. Reference standards include NEPRA PSC Clause 7.48 & 7.89 the Building Code of Pakistan – Fire Safety Provisions 2016, Section 4.1.6, and NFPA 1600: Standard on Disaster/Emergency Management.

8.2 Current Practices

- a. Emergency plans exist at PESCO but are generic and not site-specific
- b. Evacuation routes are not clearly marked in older buildings, and assembly points are inconsistently designated.
- c. Staff rely heavily on senior colleagues for guidance rather than documented evacuation protocols.
- d. Fire drills are irregular, and corrective actions from drills are not systematically implemented.
- e. Emergency lighting and PA systems are absent in many grid stations.
- f. Safety inspections are conducted regularly, but responses from departments are often delayed or incomplete.

8.3 Gaps & Impacts

- a. Generic plans result in confusion during real emergencies.

- b. Lack of regular drills and emergency signage delays evacuation.
- c. Absence of recovery protocols prolongs downtime after incidents.
- d. Weak linkage between fire risk assessments and emergency measures undermines preparedness.

8.4 Strengths

- a. Safety Directorate does conduct inspections, though manpower is limited.
- b. Regional Training Center organizes occasional fire drills.

8.5 Opportunities for Improvement

- a. Develop site-specific fire emergency response plans.
- b. Ensure senior management participation in drills.
- c. Link fire risk assessments directly to emergency preparedness measures.

8.6 Recommendations

- d. Draft facility-specific emergency plans for all substations, offices, and warehouses.
- e. Designate and mark assembly points at each site.
- f. Conduct quarterly fire drills with evaluation and corrective action tracking.
- g. Install emergency lighting, alarms, and PA systems in all high-risk sites.
- h. Establish post-incident recovery procedures to minimize service downtime.

9.0 EXISTING FIREFIGHTING SYSTEM

9.1 TOR Requirement

The TORs require review of electrical installations and associated fire protection measures to ensure compliance with NEPRA PSC 2024 sections 7.17, 7.18 & 7.19, Building Code of Pakistan, and international best practice (NFPA 70 NEC, IEEE 979). Focus areas include wiring systems, panel boards, breakers, transformers, and fixed fire suppression measures.

9.2 Current Practices

- a. Many substations operate with aged wiring, panels, and breakers showing visible deterioration.
- b. Poor cable management and missing labeling are common. Outdoor installations lack IP-rated enclosures.
- c. Control rooms lack automatic suppression systems (CO₂ or clean agent).
- d. Transformer bays lack barriers or separation distances as given vide BCP clause 8.2.7
- e. Portable extinguishers are available but often expired, insufficient, or improperly placed.

9.3 Gaps & Impacts

- a. High risk of fire spread due to faulty installations and lack of barriers.
- b. Expired extinguishers reduce immediate response capability.
- c. Absence of suppression systems in control rooms increases escalation risk during unmanned hours.

9.4 Strengths

- a. Basic fire extinguishers are available at most sites.
- b. Grid stations installations have sand buckets as rudimentary fire-fighting tools.

9.5 Opportunities for Improvement

- a. Introduce fixed suppression in control rooms and battery rooms.
- b. Upgrade aging wiring and panels with IP-rated enclosures.
- c. Ensure transformer separation and containment pits as per IEEE/NEPRA standards.

9.6 Recommendations

- a. Conduct a phased upgrade of electrical wiring, panels, and labeling.
- b. Install fixed suppression (CO₂/clean agent) in all control rooms.
- c. Ensure fire wall barriers and oil containment pits for transformers.
- d. Replace expired extinguishers and ensure correct placement.
- e. Develop preventive maintenance schedules to meet PSC requirements.

10.0 TRAININGS AND CAPACITY BUILDING

10.1 TOR Requirement

The TORs require review of the methods, contents, and frequency of fire safety training, ensuring that programs are risk-based and in line with international best practices. The consultant must also confirm that employee and contractor training needs are being met, records are maintained, fire drills are carried out regularly, and corrective actions from drills are implemented. The assessment is benchmarked against the NEPRA Power Safety Code (sections 7.6, 7.7 & 7.8), the Building Code of Pakistan – Fire Safety Provisions (2016, Section 5.2), and best practices such as the IFC EHS Guidelines 2007.

10.2 Current Practices

- a. PESCO has fire safety training modules available at the Regional Training Center, and periodic fire drills are held.
- b. Training effectiveness is not measured; modules are generic and not tailored to grid-specific hazards such as transformer oil fires, arc flashes, or battery room explosions.
- c. Training participation is limited to junior staff; senior management and engineers rarely participate.
- d. Contractors are not systematically included in PESCO-led fire safety training or drills, despite their frequent exposure to high-risk activities.
- e. Drill evaluations are not documented, and corrective actions are not tracked, reducing the value of exercises.

10.3 Gaps & Impacts

- a. Training does not reflect actual fire hazards in substations and distribution facilities.
- b. Excluding management reduces leadership readiness during emergencies.
- c. Contractors remain unprepared, creating systemic vulnerabilities.

- d. Lack of post-drill corrective action reduces organizational learning and continual improvement.

10.4 Strengths

- a. A formal training framework exists through the Regional Training Center.
- b. Fire drills, although irregular, demonstrate management's intent to improve preparedness.
- c. Staff are generally receptive to fire safety training.

10.5 Opportunities for Improvement

- a. Tailor training programs to operational risks (transformer fires, electrical arc faults).
- b. Expand participation to all staff levels and contractors.
- c. Document and evaluate drills with follow-up corrective actions.
- d. Use training to foster a proactive fire safety culture at all levels.

10.6 Recommendations

- a. Curriculum Revision – Update training modules to include PESCO-specific fire hazards and practical response strategies.
- b. Inclusive Participation – Make fire safety training and drills mandatory for all staff levels, including management and contractors.
- c. Evaluation Framework – Introduce structured evaluations for all fire drills; document corrective actions and ensure closure.
- d. Awareness Campaigns – Launch annual fire safety awareness drives (e.g., Fire Safety Week, toolbox sessions, management walk-downs).
- e. Competency Certification – Nominate key staff for accredited fire safety certifications (e.g., NFPA, IOSH, IFC-recognized programs) to build internal expertise.

11.0 COMPLIANCE WITH REGULATORY AND LEGAL REQUIREMENTS

11.1 TOR Requirement

The TORs require an assessment of PESCO's compliance with national fire safety legislation and codes, specifically the NEPRA Power Safety Code 2024 and the Building Code of Pakistan – Fire Safety Provisions (2016). The review must also highlight any gaps where PESCO's practices fall short of regulatory expectations, and recommend improvements for alignment with legal requirements and industry best practices.

11.2 Current Practices

- a. PESCO's Safety Manual (Chapters 7 & 16) has been approved by NEPRA and provides a policy-level framework for fire safety. However, implementation is inconsistent across circles and grid stations.
- b. Fire drills are not held on the mandatory quarterly basis required under NEPRA PSC Clause 7.48.13.
- c. Firefighting equipment (extinguishers, hydrants, and suppression systems) are either absent, expired, or not maintained as per PSC Clause 7.48.4 and Building Code chapter 9.
- d. Egress provisions (exits, signage, emergency lighting) do not fully comply with Building Code Section 4.1.6 and PSC Clause 7.43.
- e. Documentation of compliance (inspection logs, drill records, maintenance reports) is weak, making it difficult to demonstrate conformity during audits.

11.3 Gaps & Impacts

- a. Partial compliance with NEPRA and Building Code creates risk of penalties, regulatory intervention, and reputational loss.

- b. Inconsistent implementation across circles undermines uniform safety performance.
- c. Weak documentation prevents PESCO from proving compliance, even where measures exist.

11.4 Strengths

- a. PESCOs Safety Manual is NEPRA-approved and includes fire safety provisions.
- b. Management has endorsed fire safety at policy level.
- c. Some firefighting equipment is deployed, though inadequately maintained.

11.5 Opportunities for Improvement

- a. Strengthen record-keeping to demonstrate compliance.
- b. Close gaps in equipment maintenance, fire drills, and safe evacuation provisions.
- c. Use compliance audits as a tool for continual improvement.

11.6 Compliance Matrix

Following matrix gives a summary of some observed status relevant to fire safety in PESCO

Requirement	Code Reference	Observed Status at PESCO	Compliance Status
Quarterly fire drills	NEPRA PSC 7.48.13 BCP 6.5	Drills irregular, low participation	Non-Compliant
Firefighting equipment maintenance	NEPRA PSC 7.48.4.	Extinguishers expired, hydrants absent	Partial

Requirement	Code Reference	Observed Status at PESCO	Compliance Status
Emergency exits, signage, lighting	NEPRA PSC 7.43, BCP Ch. 10.	Poor signage, inadequate lighting	Partial
Fire detection & alarm systems	NEPRA PSC 7.46.1; NFPA 10; BCP 2016 Ch. 9.7	Absent in most control rooms	Non-Compliant
Fire barriers between buildings/ transformers.	IEEE 979; BCP 2016 ch.8.6.	Not provided in most transformer bays	Non-Compliant
Policy framework	NEPRA PSC 6	Fire Safety Policy documented & NEPRA-approved	Compliant

11.7 Recommendations

- Close Compliance Gaps – Implement quarterly drills, ensure all firefighting equipment is maintained, and upgrade signage/lighting.
- Enhance Documentation – Establish a Regulatory Compliance Register to track inspections, maintenance, drills, and corrective actions.
- Upgrade Infrastructure – Provide fire detection, alarm systems, and transformer fire barriers in line with PSC and Building Code.
- Conduct Annual Compliance Audits – Independent audits to verify conformity with NEPRA and Building Code requirements.
- Leadership Oversight – Require the Safety Directorate to report quarterly compliance status directly to PESCO senior management.

12.0 PICTORIAL EVIDENCE

In line with the Terms of Reference, this assessment included field inspections of PESCO facilities. The following pictorial evidence has been incorporated to demonstrate actual site conditions and to validate the consultant's observations.

The photographs provide a clear visual record of hazards, deficiencies, and unsafe practices identified such as exposed wiring, inadequate housekeeping, non-functional firefighting equipment, and absence of detection and alarm systems etc. These images serve as objective proof of the gaps between existing fire safety policies and field realities, ensuring that findings are transparent, verifiable, and aligned with the requirements of the NEPRA Power Safety Code 2024 and the Building Code of Pakistan Fire Safety Provisions (2016).

By documenting risks in this manner, the pictorial evidence strengthens the justification for the recommendations provided later in this report. It also provides PESCO leadership and field management with a practical tool for prioritizing corrective actions, enhancing awareness, and reinforcing a proactive fire safety culture. Following are some pictorial evidence of fire hazards, combustible materials and sources of ignition:

Pic 1 - Loose and exposed wiring inside control room – non-compliance with PSC Clause 7.46 (Fire Prevention) and Building Code Section 4.2.2 on electrical fire safety.



Pic 2 – Storage of oil drums -Unsafe storage of transformer oil drums without containment – major fire and environmental hazard; TOR requirement on flammable storage not met.



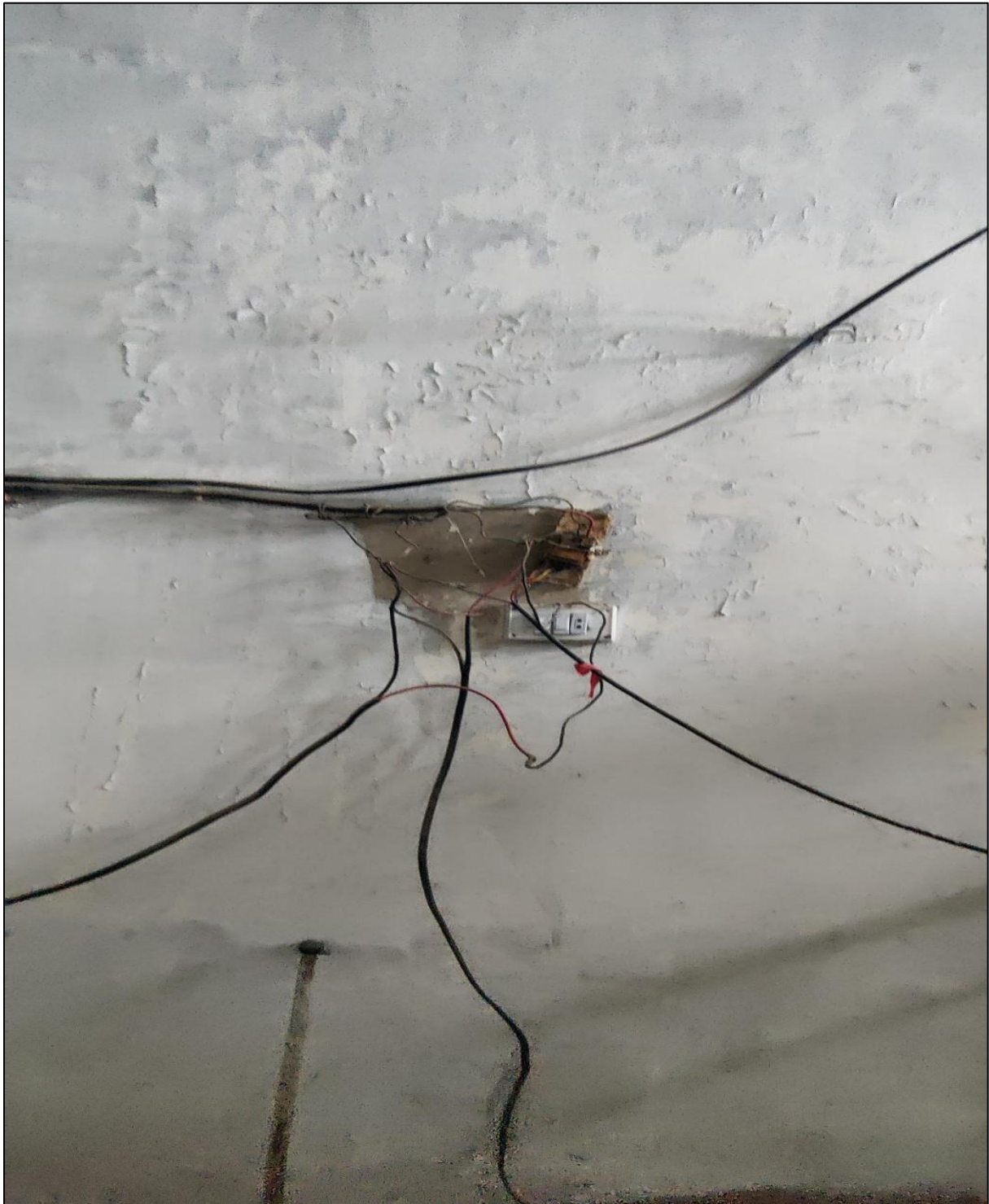
Pic 3 – Broken and haphazard trench covers and improper storage of material - obstructs safe evacuation, creates tripping and ignition risks; non-compliance with Building Code Section 4.2.3.1.1 (Safe Egress) and TOR requirement on hazard identification.



Pic 4 – Unserviceable fire extinguishers - no assurance of firefighting readiness; non-compliance with NEPRA PSC 7.46.1 and Building Code Section 6.2 (Portable Extinguishers).



Pic 5 – loose and improper wiring, open connections & broken sockets - major ignition sources and electrocution risks; non-compliance with PSC Clause 7.46 (Fire Prevention) and Building Code Section 4.2.2 (Electrical Fire Safety).



Pic 6 – Loose and improper wiring as well as cooking in the Control Room -non-compliance with PSC Clause 7.46 (Fire Prevention), Fire and Building Code Section 4.2.2 on electrical fire safety, and unsafe act; contravenes TOR requirement for identifying sources of ignition and PSC mandate on fire prevention.



Pic 7 – Loose and hanging wires - non-compliance with NEPRA PSC section 7.46 (Fire Prevention) and Building Code Section 4.2.2 on electrical fire safety.



Pic 8 – Improper storage of paper files on switchboard panels – adds combustible fuel load, violating TOR requirement on identifying unsafe storage and ignition risks and potential incident scenario, ref NEPRA PSC 7.44 & 7.48.18.



Pic 9 – Cable tray and cables about to fall -unsafe infrastructure creating risk of electrocution, short-circuiting, and fire propagation; violates NEPRA PSC section 7.46 (Fire Prevention) and Building Code Section 4.3 (Electrical Installations – Mechanical Protection).



Pic 10 - Broken window panes - can provide access to animals which may cause short circuit in the panels - this is as unsafe condition; non-compliance with PSC section 7.46 (Fire Prevention) and TOR requirement to control ignition sources and external hazards.



Pic 11 – Storage of waste material behind the panels - adds combustible load and obstructs safe access to electrical equipment; non-compliance with Building Code Section 4.5 (Clearances around Electrical Installations) and TOR requirement on housekeeping and hazard control.



Pic 12 – conventional tube light covered with cobwebs – Lack of proper housekeeping, leading to increased risk of overheating and fire; non-compliance with PSC section 7.44 (Housekeeping) and Building Code Section 6.1 (General Fire Safety – Preventing Ignition Sources).



Pic 13 – Poor vegetation management within the grid compound – dry grass and unmanaged growth can easily ignite and cause fire spread, especially near transformers and cables. This reflects inadequate vegetation management and non-compliance with NEPRA PSC section 7.46 (Fire Prevention) and BCP Clauses 6.12.



Pic 14 – Cables laid outside trenches - Power cables laid without proper trenching and directly exposed to extremes of weather – create risks of insulation damage, short-circuiting, and fire. This condition violates PSC section 7.46 (Fire Prevention), and reflects inadequate infrastructure safeguards in high-risk electrical areas.



Pic 15 – Oil Leakage from Power Transformer – Oil Leaking from power transformer with overgrown vegetation underneath, absence of gravel bedding, and no evidence of oil containment pits or sumps – all of which heighten the risk of fire spread, soil contamination, and uncontrolled oil discharge. This represents a critical non-compliance with PSC section 7.46 (Fire Prevention) and NFPA 30 – Flammable and combustible liquids code, which require containment and fire prevention measures for oil-filled equipment. The condition reflects a major gap in fire safety planning and infrastructure safeguards. With overgrown vegetation underneath and no gravel.



Pic 16 – Stores - presents serious non-compliance with Section 16 of the Building Code of Pakistan Fire Safety Provisions and NEPRA PSC section 7.44, Housekeeping. The high fire load, absence of detection and alarm systems, lack of extinguishers, poor housekeeping and obstructed egress all violate the prescribed standards



Pic 17 Office Corridor - presents serious non-compliance with Section 16 of the Building Code of Pakistan Fire Safety Provisions and NEPRA PSC section 7.44, Housekeeping. The high fire load, poor housekeeping and obstructed egress all violate the prescribed standards.



Pic 18 – Unsafe storage of garbage behind offices. Non-compliance with Section 16 of the Building Code of Pakistan Fire Safety Provisions and NEPRA PSC clause 7.44 & 7.46. The high fire load, poor housekeeping and improper disposal of garbage, all violate the prescribed standards.



13.0 RISK ANALYSIS – SUB-PROJECTS

13.1 Introduction

The purpose of this Risk Assessment is to evaluate the hazards identified in the Gap Analysis and assign them qualitative risk ratings based on likelihood of occurrence and severity of consequences. Subsequently, an OHS management plan based on these risk indices shall be prepared which will be utilized in the execution of EDEIP. A 3x3 Qualitative Risk Matrix has been used to calculate the risk index of each finding. This approach offers following advantages:

- It simplifies interpretation for managers and field staff who may or may not have technical HSE backgrounds.
- It ensures consistent application across different facility types (grid stations, transmission lines, administrative buildings).
- It aligns with standard practice in NEPRA's HSE Code and IFC/World Bank expectations for project-based OHS frameworks.

13.2 Methodology and interpretation.

a. Risk analysis Table

Severity / Likelihood	Low (1)	Medium (2)	High (3)
Minor (1)	Low Risk (1)	Low Risk (2)	Medium Risk (3)
Moderate (2)	Low Risk (2)	Medium Risk (4)	High Risk (6)
Severe (3)	Medium Risk (3)	High Risk (6)	High Risk (9)

b. Likelihood Scale:

1 = Rare (unlikely to occur)

2 = Possible (may occur occasionally)

3 = Likely (occurs frequently or under normal conditions)

c. Severity Scale:

1 = Minor (no injury, small asset damage)

2 = Moderate (injury requiring medical care, asset damage)

3 = Severe (fatality, major asset loss, long outage)

d. Risk Rating:

- **Low (1–2):** Acceptable with routine controls.
- **Medium (3–4):** Requires specific risk reduction measures.
- **High (6–9):** Unacceptable – immediate action required.

13.3 Risk Assessment of individual sub projects:

Following is a detailed Risk Assessment for each of the tasks listed under the Electricity Distribution Efficiency Improvement Project (EDEIP). Each task is addressed separately with focus on the unsafe actions/conditions which may be performed by the person performing the task, the consequences arising out of it and persons effected by it:

a. 11-kV Capacitor Banks

Risk	Consequences	Risk Index	Persons Affected
Arc flash	Severe burns, equipment damage, fatality	High	Employees

Stored electrical energy	Electrical shock, arc hazard	Medium	Employees
Fire from overheating	Fire, equipment failure, asset loss	Medium	Employees & Public

b. Extension of Nine Grid Stations

Risk	Consequences	Risk Index	Persons Affected
Contact with live conductors	Electrocution, burns	High	Employees
Tripping hazards	Minor injuries, slips	Medium	Employees & Public
Fire due to overloading	Cable fires, power failure	Medium	Employees & Public

c. Augmentation of nine Grid Stations

Risk	Consequences	Risk Index	Persons Affected
Thermal stress	Component failure, overheating	Medium	Employees

Arc blast	Severe injuries, fatality	High	Employees
Slips and trips	Minor injuries, falls	Low	Employees

d. Installation of Transformer Monitoring System

Risk	Consequences	Risk Index	Persons Affected
Energized equipment	Fatal electric shock	High	Employees
Heat exposure	Burns, discomfort	Medium	Employees
Fire from bad wiring	Fire, equipment failure	Medium	Employee & Public

f. Installation of 65,000 Smart Meters

Sub-Risk	Consequences	Risk Index	Persons Affected
Wrong meter connection	Meter faults, billing errors	Medium	Employee & Public
Electrical shock	Injury to technician	Medium	Employees
Fire from overload	House fires, meter burnouts	Medium	Public

g. Aerial Bundle Cable (ABC) for 60 Feeders

Risk	Consequences	Risk Index	Persons Affected
Fall from poles	Serious injury, death	High	Employees
Contact with conductors	Burns, electric shock	High	Employees
Fire from poor joints	Overheating, cable fire	Medium	Public

13.4 Mitigation Measures:

Below is the brief explanation of the chart used for prescribing mitigation measure and subsequent tables give the mitigation recommendations:

Hazard Type	Identified Risks	Mitigation Measures	PPE Required	Special Equipment
Gives the type of hazard e.g., Life or Asset	Gives the risks associated with that hazard e.g., Arc flash, electrocution, falls etc.	Gives the measures to be avoided to prevent accidents e.g., Lockout-tag out (LOTO), training, grounding, live-line working protocols	Gives the equipment which is used a person for personal protection e.g., Insulated gloves, arc-rated suit, safety helmet, dielectric	Gives the special equipment for special tasks e.g., Arc flash suit, voltage detectors, insulated tools etc.

			boots, face shield etc.	
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Note 1: For all the tasks that require PPE, the basic PPE i.e. (Hard hat, safety glasses/goggles, ear plugs (for high noise area), reflective vest, cut resistant gloves, safety shoes with steel tow) shall be mandatory.

Note 2: It shall be mandatory to obtain a valid **Permit to Work** (PTW) as per current SOP of PESCO before commencing a task every time and implement it.

13.5 Task a. 11-kilovolt (kV) Capacitor Banks

Hazard Type	Identified Risks	Mitigation Measures	PPE Required	Special Equipment
Life Safety	Arc flash, electrocution, falls during installation/maintenance	Lockout-tag out (LOTO), training, grounding, live-line working protocols	Insulated gloves, arc-rated suit, safety helmet, dielectric boots, face shield.	Arc flash suit, voltage detectors, insulated tools
Fire	Short circuit, overheating, internal capacitor failure	Thermo graphic scanning, surge protection, proper ventilation	Face shield, fire resistant clothing.	Fire extinguisher (Class C), thermal camera

13.6 Task b. Extension of Nine Grid Stations

Hazard Type	Identified Risks	Mitigation Measures	PPE Required	Special Equipment
Life Safety	Excavation collapse, electrical hazards, collision from moving machinery	Barricading, trench shoring, use of bandsman	Hard hat, reflective vest, boots, gloves	Excavation shoring system, ground fault interrupters
Fire	Cable insulation fires, transformer oil fires	Fire barriers, clear signage, designated smoking areas	Face shield, fire resistant clothing.	Fire suppression system, foam extinguishers

13.7 Task c. Augmentation of Nine Grid Stations

Hazard Type	Identified Risks	Mitigation Measures	PPE Required	Special Equipment
Life Safety	Electrical burns, ergonomic hazards, noise	Task rotation, hearing protection, safe work permits	Hearing protection, gloves, safety glasses, coveralls	Load testing equipment, lifting tools
Fire	Faults due to poor connections or insulation degradation	Routine inspection, load balancing	Face shield, fire resistant clothing.	Infrared camera, dry chemical extinguishers

13.8 Task d. Installation of Transformer Monitoring System

Hazard Type	Identified Risks	Mitigation Measures	PPE Required	Special Equipment
Life Safety	Exposure to high voltage during sensor installation, confined space risks	Lockout-Tagout, permit to work, monitor gas/oil leaks	Full-body coveralls, safety glasses, gloves	Multimeter, gas detector, confined space entry kit
Fire	Electrical sparks near oil-filled transformer	Isolation and purging	Face shield, fire resistant clothing.	Portable CO ₂ extinguisher

13.9 Task e. Installation of 65,000 Smart Meters

Hazard Type	Identified Risks	Mitigation Measures	PPE Required	Special Equipment
Life Safety	Electric shock, interaction with residents, repetitive strain injury	Power shutoff during installation, ergonomic tools	Safety gloves, non-conductive shoes, helmet	Voltage tester, handheld power tools
Fire	Improper wiring causing short circuit	Pre-installation inspection and verification	Face shield, fire resistant clothing.	Portable ABC fire extinguisher

13.10 Task f. Aerial Bundle Cable (ABC) Installation for 60 Feeders

Hazard Type	Identified Risks	Mitigation Measures	PPE Required	Special Equipment
Life Safety	Working at heights, cable tension recoil, live cable contact	Fall protection, power shutdown, trained personnel	Fall arrest harness, insulated gloves, helmet	Cable pulling winch, live-line tools, cherry picker
Fire	Sparks during connection, overheating joints	Proper jointing methods, joint testing	Face shield, fire resistant clothing.	Fireproof covers, thermal imaging camera

14.0 RISK ANALYSIS – PESCO

14.1 Introduction

The purpose of this section is to evaluate the overall fire and life safety risks across PESCO's grid, transmission, and administrative facilities, based on the gaps identified in the earlier analysis. A 3x3 qualitative risk matrix has been adopted for consistency, simplicity, and ease of interpretation by managers, engineers, and field staff. The analysis allows PESCO to:

- a. Translate technical hazards into understandable risk levels.
- b. Prioritize corrective actions by highlighting High, Medium, and Low risks.
- c. Align with regulatory expectations under the NEPRA Power Safety Code (2024) and the Building Code of Pakistan Fire Safety Provisions (2016).
- d. Provide a foundation for the subsequent Mitigation Plan and OHS Action Plan.

The section is divided into two parts:

- a. **Grids & Transmission Facilities** – which face higher operational risks due to transformers, substations, and live-line work.
- b. **Administrative Buildings** – where fire and life safety risks are relatively lower in scale but still critical for staff safety and business continuity

14.2 Methodology and interpretation.

- a. Risk Matrix (3x3) values

Severity / Likelihood	Low (1)	Medium (2)	High (3)
Minor (1)	Low Risk (1)	Low Risk (2)	Medium Risk (3)
Moderate (2)	Low Risk (2)	Medium Risk (4)	High Risk (6)
Severe (3)	Medium Risk (3)	High Risk (6)	High Risk (9)

e. **Likelihood Scale:**

- 1 = Rare (unlikely to occur)
- 2 = Possible (may occur occasionally)
- 3 = Likely (occurs frequently or under normal conditions)

f. **Severity Scale:**

- 1 = Minor (no injury, small asset damage)
- 2 = Moderate (injury requiring medical care, asset damage)
- 3 = Severe (fatality, major asset loss, long outage)

g. **Risk Rating:**

- **Low (1–2):** Acceptable with routine controls.
- **Medium (3–4):** Requires specific risk reduction measures.
- **High (6–9):** Unacceptable – immediate action required.

14.3 Risk Assessment – Grids & Transmission.

This table summarizes the major fire and life safety risks in PESCO’s grid stations and transmission infrastructure. Each identified gap is scored using the 3x3 matrix, showing its likelihood, severity, and overall risk rating. The table provides managers with a clear picture of which risks are most urgent (High), which

require monitoring and improvement (Medium), and which are acceptable with routine controls (Low).

Table 14.1

Gap Identified	Likelihood	Severity	Risk Rating	Key Consequences
Lack of smoke detectors	3	2	High (6)	Delayed detection, fire escalation
Lack of heat detectors	2	2	Medium (4)	Slow recognition of overheating
Lack of alarm systems	2	2	Medium (4)	Delayed evacuation response
Absence of sprinklers	3	3	High (9)	Uncontrolled fire spread
Inadequate extinguishers	2	2	Medium (4)	Small fires escalate
Lack of hydrants	3	3	High (9)	No water for firefighting
Absence of automatic suppression	3	3	High (9)	Fire not controlled in unmanned sites
Lack of fire-resistant doors	2	2	Medium (4)	Fire spreads between rooms
Absence of fire walls	3	3	High (9)	Transformers exposed to cascading fire
Inadequate emergency exits	3	3	High (9)	Evacuation delays, life risk
Deficient fire safety training	2	2	Medium (4)	Weak response, injury risk
Absence of drills	2	2	Medium (4)	Poor evacuation preparedness

Gap Identified	Likelihood	Severity	Risk Rating	Key Consequences
Inadequate maintenance	2	2	Medium (4)	Systems fail in emergencies
Weak inspections	2	2	Medium (4)	Hazards persist undetected
No emergency response plans	3	3	High (9)	Uncoordinated response, major losses
Poor coordination with fire services	2	2	Medium (4)	Delayed firefighting support
Poor documentation/reporting	2	2	Medium (4)	Repeat incidents, no learning

14.4 Risk Assessment – Administrative Buildings

Purpose of Table:

This table highlights fire safety risks specific to PESCO's administrative offices, stores and bachelor officers hostel . While these facilities do not carry the same electrical load hazards as substations, the presence of staff, public visitors, material stores, kitchens and business-critical records means that lapses in fire detection, suppression, and evacuation planning can still cause severe consequences.

Table 14.2

Gap Identified	Likelihood	Severity	Risk Rating	Key Consequences
Lack of smoke detectors	3	2	High (6)	Delayed detection, fire escalation

Gap Identified	Likelihood	Severity	Risk Rating	Key Consequences
Lack of heat detectors	2	2	Medium (4)	Slow response to fire
Absence of alarm systems	2	2	Medium (4)	Staff unaware, delayed evacuation
Absence of sprinklers	3	3	High (9)	Fire spreads, extensive losses
Inadequate extinguishers	2	2	Medium (4)	Initial fires not contained
Lack of fire-resistant doors	2	2	Medium (4)	Fire spreads between compartments
Inadequate emergency exits	3	3	High (9)	Evacuation bottlenecks, life risk
Lack of fire safety training	2	2	Medium (4)	Staff unprepared
Absence of drills	2	2	Medium (4)	Panic/confusion during fire
No maintenance schedules	2	2	Medium (4)	Fire equipment fails
Weak inspections	2	2	Medium (4)	Hazards unreported

Gap Identified	Likelihood	Severity	Risk Rating	Key Consequences
No ERP	2	2	Medium (4)	Poor fire emergency readiness
Poor coordination with fire services	2	2	Medium (4)	Response delays
Poor documentation/reporting	2	2	Medium (4)	No systemic improvements

14.5 Mitigation Measures

The mitigation plan translates the identified risks into structured corrective actions. Each measure has been prioritized according to the risk rating (High, Medium, and Low) from the 3x3 qualitative matrix.

- High-risk items (6–9) demand immediate attention, as they involve potential fatalities, major asset damage, or prolonged service disruptions.
- Medium-risk items (3–4) require systematic control measures and should be addressed in the short to medium term.
- Low-risk items (1–2) are acceptable with current controls but should be integrated into long-term safety and infrastructure improvement strategies.

Note: The plan also draws upon requirements from the NEPRA Power Safety Code (2021) and the Building Code of Pakistan Fire Safety Provisions (2016) to ensure alignment with regulatory expectations.

14.6 High-Risk Mitigation Measures (Immediate Priority)

This table highlights the most urgent interventions for PESCO, addressing gaps

that could directly lead to life-threatening incidents or catastrophic damage. These measures should be implemented without delay and given priority in budgeting and planning.

Table 14.3

High-Risk Gap	Mitigation Action	Reference Standard
Absence of sprinklers	Install automatic sprinkler systems in control rooms, substations, and administrative blocks	NEPRA PSC 7.46,7.46.1; NFPA 10 & 13.
Lack of hydrants	Provide hydrant networks and on-site water storage tanks sized for grid station needs	NEPRA PSC 7.46,7.46.1; NFPA 24
Absence of automatic suppression	Install clean-agent or CO ₂ suppression systems in control rooms and GIS substations	NFPA 24
Absence of fire walls	Construct fire-rated walls between transformers and critical equipment	IEEE 979; Guide for substation fire protection BCP 2016 section 8.6.2
Inadequate emergency exits	Mark, illuminate, and ensure compliance with minimum exit width; add alternate exits	BCP 2016 Ch. 10
No site specific Emergency Response Plans	Develop site-specific ERPs including evacuation maps, assembly points, and fire roles	NEPRA PSC 7.26.11,7.44;

High-Risk Gap	Mitigation Action	Reference Standard
Falls/electrocution risks (work at height/live-line work)	Enforce Permit-to-Work (PTW), Lockout/Tagout (LOTO), and fall protection systems	NEPRA PSC 7.18.11, 7.18.54 & 7.29. NFPA 70E

14.7 Medium-Risk Mitigation Measures (Short to Medium Term)

This table covers risks that are serious but manageable through structured programs. By addressing these systematically, PESCO can build resilience and reduce dependency on reactive firefighting.

Table 14.4

Medium-Risk Gap	Mitigation Action	Reference Standard
Lack of smoke/heat detectors	Install detectors in substations, battery rooms, offices	NFPA 72 BCP Ch.9
Lack of alarm systems	Introduce audible/visible alarm systems with central monitoring	NFPA 72 BCP Ch.9
Inadequate extinguishers	Reassess quantity, distribute per NFPA 10; maintain regularly	NFPA 10 BCP Ch.9 – Fire Protection Systems.
Deficient fire safety training	Develop structured fire safety training modules for staff & contractors	NEPRA PSC 7.7 & 7.48.4; NFPA 70E;

Medium-Risk Gap	Mitigation Action	Reference Standard
		ISO 45001 Cl. 7.2
Absence of regular drills	Conduct quarterly fire drills with local fire brigades	NEPRA PSC 7.48.13 & 7.48.14.
Inadequate inspections	Standardize inspection checklists, ensure accountability for corrective action	NEPRA PSC 7.16
Lack of coordination with fire services	Establish MoUs with local fire brigades, conduct joint site familiarization	NEPRA PSC 7.3.1, 7.48.5; ,7.48.14 & 7.48.18

14.8 Low-Risk Mitigation Measures (Long Term / Continuous Improvement)

This table lists items that currently pose lower risks but, if ignored, could escalate. Incorporating them into future capital improvements and ISO-based management systems will ensure sustainable fire safety culture.

Table 14.5

Low-Risk Gap	Mitigation Action	Reference Standard
Weak documentation/ reporting	Establish electronic incident reporting and near-miss logging	NEPRA PSC 7.14.1 & 7.14.2 ISO 45001 Cl. 7.5
Routine inspections not logged	Create centralized inspection & audit database	NEPRA PSC 7.42
Minor slips/trip hazards	Implement continuous housekeeping campaigns	NEPRA PSC 7.44

Awareness gaps	Regular toolbox talks and annual Fire Safety Week	IFC EHS Guidelines
Infrastructure resilience	Upgrade to fire-resistant building materials in future expansions	BCP 2016 Ch. 8. Fire Safety construction features.

Note:

The mitigation actions, if implemented systematically, will shift PESCO’s current fire safety posture from a reactive, compliance-driven approach to a proactive, risk-based fire management system. By prioritizing high-risk interventions immediately, while steadily addressing medium and low-risk items, PESCO can achieve compliance with NEPRA PSC 2024 and the Building Code of Pakistan, while also safeguarding its personnel, the public, and critical assets.

15.0 OHS PLAN IMPLEMENTATION ROAD MAP

15.1 Introduction

To address the gaps mentioned in preceding sections, a comprehensive corrective action plan should be implemented, focusing on installing and maintaining necessary fire prevention and firefighting equipment, conducting regular training and drills, and ensuring proper documentation and coordination with external emergency services. The plan organizes corrective measures into three phases (Short-Term, Medium-Term, Long-Term) to ensure that improvements are prioritized according to urgency, resource availability, and operational risk. Following is the suggested plan which may be modified keeping in view the resource and time constraints:

15.2 Phase 1 – Short Term (0–6 Months)

Phase 1 actions provide the essential fire safety foundation for PESCO by addressing leadership commitment (TOR 1), systematic hazard identification (TOR 2), and emergency preparedness (TOR 3). These measures ensure basic legal compliance, mitigate immediate risks, and create the operational framework for subsequent phases.

Table 15.1

S.No	Action	Description	Linked TOR	Standard / Code Reference
1	Formulate OHS Cross-Functional Team	Nominate a multidisciplinary team (safety, civil, grid & transmission, PMU & procurement). Assign a team leader	TOR 1	NEPRA PSC 7.2.4 ISO 45001 Cl. 5.3

S.No	Action	Description	Linked TOR	Standard / Code Reference
		responsible for execution of the project.		
2	Approve & Circulate Fire & Life Safety Policy	Draft or update the Fire Safety Policy aligned with ISO 45001 and BCP Fire Safety Code. Get CEO approval, circulate to all departments, and display at worksites.	TOR 1	NEPRA PSC 6.
3	Conduct Kick-off Safety Orientation Sessions	Provide project-based safety briefings on hazard awareness, PPE, OHS Plan, and emergency protocols to engineers and supervisors.	TOR 1 & TOR 2	NEPRA PSC 7.6 & 7.7, ISO 45001 Cl. 7.3
4	Develop & Issue Site-Specific ERPs	Customize ERP templates by site including fire protocols, escape routes, first responder roles, and communication channels. Display at prominent locations.	TOR 3	NEPRA PSC 7.26.11,7.44; BCP 2016 clause 6.8 – Emergency Action Plans.

S.No	Action	Description	Linked TOR	Standard / Code Reference
5	Initiate Hazard Identification & Risk Assessments (HIRAs)	Conduct baseline risk assessments for each site (arc flash, oil storage, housekeeping, cable trenches). Document in a central risk register.	TOR 2	NEPRA PSC 3.3, 7.4 & 7.22; NFPA 70E
6	Implement Lockout-Tagout (LOTO)	Issue SOPs, conduct toolbox talks, enforce use of LOTO kits at all sites to prevent accidental energization.	TOR 2	NEPRA PSC 7.18.11, 7.18.54 & 7.29. NFPA 70E;
7	Procure & Issue PPE & SPE	Provide task-specific PPE/SPE: arc-rated suits, insulated gloves, dielectric boots, helmets, fall arrest kits. Maintain records and inspect regularly.	TOR 1 & TOR 2	NEPRA PSC 4, 7.23 NFPA 70E; ISO 45001 Cl. 7.1
8	Barricade & Label Dangerous Zones	Use warning tapes, signage, and fencing to mark energized areas, trenches, and unsafe zones. Ensure NEPRA/ISO compliance.	TOR 2	NEPRA PSC 7.18.55 & 7.43

S.No	Action	Description	Linked TOR	Standard / Code Reference
9	Develop Fire Watch Protocol for Hot Work	Assign trained fire watchers, provide extinguishers, maintain checklists, and enforce hot work permits for welding and cutting.	TOR 2	NFPA 51B; NEPRA PSC 7.18.11 & 7.18.54
10	Establish Coordination with Local Fire Services	Formally link with local fire brigades, exchange contacts, plan joint future drills, and ensure site familiarization.	TOR 3	NEPRA PSC 7.3.1, 7.48.5; ,7.48.14 & 7.48.18

15.3 Phase 2 – Medium -Term Actions (6–18 Months)

This phase consolidates safety culture by embedding structured procedures, upgrading critical firefighting infrastructure, and institutionalizing hazard management into daily operations. It addresses TOR 2 (Hazard Identification), TOR 3 (Emergency Planning), TOR 4 (Firefighting Systems), TOR 5 (Utilities Safety), TOR 6 (Training), and TOR 7 (Regulatory Compliance).

Table 15.2

S.No	Action	Description	Linked TOR	Standard / Code Reference
1	Install/Upgrade Firefighting Equipment	Add hydrants, hose reels, and strategically placed extinguishers. Replace expired units	TOR 4	NEPRA PSC 7.46,7.46.1; NFPA 10;

S.No	Action	Description	Linked TOR	Standard / Code Reference
		and ensure compliance with NFPA 10 & BCP requirements.		BCP 2016 Ch. 9
2	Install Fire-Rated Infrastructure	Retrofit control rooms with fire-rated doors, fire partitions, and walls between transformers to contain potential fires.	TOR 4 & TOR 5	NEPRA PSC 7.46.1, 7.46.4; NFPA 80; BCP 2016 Ch.8 – Fire Safety Construction Features.
3	Establish Central Maintenance Register	Develop and implement a unified maintenance register for all firefighting and electrical safety equipment with inspection schedules.	TOR 4 & TOR 5	NEPRA PSC 7.46.3 & 7.46.5; ISO 45001 Cl. 9.1
4	Conduct Thermal Imaging Scans	Use infrared cameras to identify hot spots in conductors, capacitor banks, and switchgear. Record and track data to prevent overheating fires.	TOR 2 & TOR 5	NEPRA PSC 7.46.5; NFPA 70B
5	Confined Space Entry Program	Introduce confined space permits, training, gas detection, and	TOR 5 & TOR 6	NEPRA PSC 7.8.1,

S.No	Action	Description	Linked TOR	Standard / Code Reference
		rescue protocols for transformer pits, ducts, and cable vaults.		7.8.2, 7.18.11 & 7.18.51 OSHA 29 CFR 1910.146;
6	Develop Joint Hazard Log	Combine HIRAs, inspections, and incident reports into a master hazard log. Use it for prioritizing mitigation and follow-ups.	TOR 2 & TOR 7	NEPRA PSC 7.1.2 & 7.14.1; ISO 45001 Cl. 6.1
7	Advanced Fire & Electrical Safety Training	Provide specialized training on arc flash response, SF ₆ handling, hot work fire watch, and risk leadership for engineers.	TOR 6	NEPRA PSC 7.7 & 7.48.4; NFPA 70E; ISO 45001 Cl. 7.2
8	Coordination with Local Fire Services	Arrange familiarization visits for fire brigades at substations. Conduct at least one joint drill annually.	TOR 3 & TOR 7	NEPRA PSC 7.44.11;
9	Documentation & Reporting System	Standardize reporting formats for inspections, drills, and incidents. Store records digitally	TOR 7 & TOR 8	NEPRA PSC 7.14.1 & 7.14.2 ISO 45001 Cl. 7.5;

S.No	Action	Description	Linked TOR	Standard / Code Reference
		and link them with central dashboard.		
10	Strengthen Housekeeping & Vegetation Control	Introduce 5S inspections, remove combustible waste, and enforce vegetation clearance around transformers.	TOR 2 & TOR 5	NEPRA PSC 7.44; NFPA 850;

Note:

By completing Phase 2, PESCO will have moved beyond basic compliance to systematized fire safety management. Infrastructure upgrades, advanced training, and structured maintenance will reduce high-risk exposures and embed fire safety into routine operations, satisfying both national regulatory requirements and World Bank safeguard expectations.

15.4 Phase 3 – Long Term Actions (18–36 Months)

Purpose of this phase is to establish advanced fire safety infrastructure, achieve compliance with international best practices, and embed a culture of continual improvement. This phase addresses TOR 1 (Leadership), TOR 3 (Emergency Planning), TOR 4 (Firefighting Systems), TOR 6 (Training & Capacity Building), and TOR 7 (Regulatory Compliance).

Table 15.3

S.No	Action	Description	Linked TOR	Standard / Code Reference
1	Install Automatic Fire	Deploy CO ₂ / clean agent systems in control rooms,	TOR 4	NEPRA PSC 7.18.56;

	Suppression Systems	server facilities, and transformer bays for rapid fire containment.		NFPA 12, 2001; BCP 2016 Ch. 9 – Fire protection systems
2	Retrofit Fire-Rated Infrastructure	Strengthen control rooms and substations with fire-rated partitions, walls, and structural reinforcements for long-term resilience.	TOR 4	NFPA 80; BCP 2016 Ch. 8 – Fire Safety Construction Features.
3	ISO 45001 Readiness Program	Launch internal audits, management reviews, and documentation updates to prepare PESCO for ISO 45001 certification.	TOR 1 & TOR 6	NEPRA PSC 7.51 ISO 45001 Cl. 9 & 10
4	Transition to Digital Safety Systems	Implement electronic inspection checklists, digital incident reporting, and a central safety dashboard.	TOR 7	NEPRA PSC 7.14.1; ISO 45001 Cl. 7.5; IFC EHS Guidelines
5	Annual Multi-Agency Fire Drills	Conduct large-scale drills involving local fire brigades, civil defense, and hospitals. Record lessons learned.	TOR 3	NEPRA PSC 7.48.13 & 7.48.14.

6	Third-Party Fire Safety Audits	Engage accredited auditors every two years to benchmark compliance against NFPA, NEPRA, and BCP provisions.	TOR 7	NEPRA PSC 7.52; ISO 19011
7	Continuous Training & Awareness	Maintain annual refresher training, leadership safety walk-downs, and continuous campaigns (fire safety week, toolbox fire talks).	TOR 6	NEPRA PSC 7.12, 7.81, & 7.82 ISO 45001 Cl. 7.3; NFPA 70E
8	Engineering Redesign for Legacy Risks	Redesign layouts of overloaded busbars, outdoor transformers, and aging switchgear to reduce long-term fire hazards.	TOR 2 & TOR 5	NEPRA PSC 7.19;
9	Data Integration & KPI Tracking	Monitor KPIs like number of incidents, drill participation, PPE compliance, and corrective action closure via dashboards.	TOR 7	NEPRA PSC 7.50, 7.51 & 7.52; ISO 45001 Cl. 9.1
10	Sustainability & Culture Building	Institutionalize safety through leadership accountability, recognition programs,	TOR 1	NEPRA PSC 3.4, 3.5 & 7.16 ; ISO 45001 Cl. 5.1;

		and integration into corporate KPIs.		IFC EHS Guidelines
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Note:

By completing Phase 3, PESCO transitions from compliance-driven fire safety to a globally benchmarked, sustainable safety management system. This phase institutionalizes automatic protection systems, integrates safety into corporate governance, and establishes PESCO as a model utility in fire and life safety management under World Bank and regulatory scrutiny.

15.5 Responsibility Matrix – Fire & Life Safety Implementation (PESCO)

The Responsibility Matrix ensures that every corrective measure is supported by clear ownership, eliminating ambiguity that previously slowed down implementation. It also strengthens accountability and monitoring, addressing World Bank and PESCO Safety Directorate concerns regarding role clarity.

a. Legend (RACI)

- **R = Responsible** → Executes the task
- **A = Accountable** → Final authority, ensures completion
- **C = Consulted** → Provides input and expertise
- **I = Informed** → Kept updated on progress

b. Phase 1 – Short Term (0–6 Months)

Action	Safety Directorate	Circle/ Field Mgt.	Grid OPN	HR/ Admin	Procurement	Consultant/ FSO
Approve & circulate updated Fire Safety Policy	A	I	I	C	I	C

Action	Safety Directorate	Circle/ Field Mgt.	Grid OPN	HR/ Admin	Procurement	Consultant/ FSO
Formulate OHS Cross-Functional Team	A	C	C	C	I	C
Hazard Identification & Risk Assessments (HIRAs)	R	R	R	I	I	C
Develop & issue ERPs	R	R	R	C	I	C
Conduct fire drills	R	R	R	I	I	C
Implement LOTO procedures	R	R	R	I	I	C
Procure & issue PPE & SPE	C	I	I	I	R	C
Fire safety & hazard training	R	C	C	C	I	C
Coordinate with local fire services	R	R	R	I	I	C

c. Phase 2 – Medium Term (6–18 Months)

Action	Safety Directorate	Circle/ Field Mgt.	Grid OPN	HR/ Admin	Procurement	Consultant/ FSO
Upgrade firefighting equipment & signage	R	C	R	I	R	C
Install smoke & heat detectors	R	C	R	I	R	C
Establish maintenance register	R	C	R	C	I	C
Start confined space entry control program	R	R	R	C	I	C
Develop joint hazard log & inspection system	R	C	C	I	I	C
Arc flash boundary documentation & enforcement	R	C	R	I	I	C
Provide advanced	R	C	C	C	I	C

Action	Safety Directorate	Circle/ Field Mgt.	Grid OPN	HR/ Admin	Procurement	Consultant/ FSO
fire/electrical hazard training						
Improve coordination with fire services	R	C	C	I	I	C

d. Phase 3 – Long Term (18–36 Months)

Action	Safety Directorate	Circle/ Field Mgt.	Grid OPN	HR/ Admin	Procurement	Consultant/ FSO
Install automatic suppression systems	R	C	R	I	R	C
Retrofit control rooms with fire-rated infrastructure	R	C	R	I	R	C
Transition to digital safety documentation	R	C	C	C	I	C

Action	Safety Directorate	Circle/ Field Mgt.	Grid OPN	HR/ Admin	Procurement	Consultant/ FSO
ISO 45001 readiness program	A	C	C	R	I	C
Annual multi-agency fire drills	R	R	R	C	I	C
Third-party fire safety audits	A	C	C	I	I	R
Continuous training & awareness programs	R	C	C	R	I	C
Engineering redesign of legacy risks	R	C	R	I	R	C

16.0 RECOMMENDATIONS

The successful implementation of Fire & Life Safety (FLS) measures under the Electricity Distribution Efficiency Improvement Project (EDEIP) requires a mix of organizational commitment, technical upgrades, and cultural transformation. Based on the gap analysis and risk assessment, the following recommendations are provided, along with key challenges PESCO may face and critical success factors for overcoming them. Following are recommended:

16.1 Strengthening the Role of the Safety Department

- a. **Challenge:** PESCO's Safety Directorate is currently under-resourced and spread thin. Recruiting and retaining certified fire safety professionals may be difficult due to financial and market constraints.
- b. **Success Factor:** Secure top management approval to prioritize resourcing of the Safety Directorate as part of EDEIP's capacity-building plan.
- c. **Recommendation:** Establish a fully staffed, technically qualified Fire & Life Safety Unit within the Safety Directorate. This unit should be equipped with fire safety professionals, inspectors, and trainers.

16.2 Leadership Commitment and Governance

- a. **Challenge:** Competing priorities (load management, revenue recovery, expansion projects) may push fire safety lower on the leadership agenda.
- b. **Success Factor:** Linking fire safety performance indicators to corporate KPIs and World Bank reporting requirements will elevate its visibility and importance.
- c. **Recommendation:** Create a cross-functional Fire & Life Safety Steering Committee chaired by senior management to provide oversight, allocate resources, and monitor progress.

16.3 Communication and Awareness

- a. **Challenge:** Field staff often lack exposure to formal documentation and rely on informal knowledge transfer.
- b. **Success Factor:** Combine visual aids, scenario-based drills, and leadership presence at safety events to improve engagement.
- c. **Recommendation:** Develop a structured fire safety communication plan, including field-level awareness campaigns, toolbox talks, safety posters, and ERP circulation in local languages.

16.4 Training and Capacity Building

- a. **Challenge:** Contractors and temporary workers are a major risk group but are often excluded from structured training.
- b. **Success Factor:** Make fire safety training mandatory for all employees and contractors before site deployment; track participation digitally.
- c. **Recommendation:** Expand beyond classroom training to include practical drills, specialized modules (arc flash, confined space, transformer oil fires), and contractor induction programs.

16.5 Fire Safety Infrastructure and Systems

- **Challenge:** Budget allocation and procurement delays may hinder timely infrastructure upgrades.
- **Success Factor:** Phase implementation with cost estimates and procurement plans integrated into EDEIP timelines.
- **Recommendation:** Prioritize installation of fire detection, alarm, and suppression systems at grid stations, substations, and administrative buildings in line with NEPRA PSC and BCP Fire Safety Provisions

11.6 Monitoring, Reporting, and Learning

- a. **Challenge:** Current monitoring is fragmented and reactive; incident reporting is weak, especially for near misses.

- b. **Success Factor:** Adopt a learning culture by making reporting anonymous, easy, and recognized as positive input rather than fault-finding.
- c. **Recommendation:** Establish a centralized monitoring framework that captures inspections, drills, incidents, and corrective actions in a digital dashboard.

16.7 Stakeholder Engagement

- a. **Challenge:** External agencies often lack resources themselves and may not prioritize utility sector support.
- b. **Success Factor:** Early engagement and MoUs (Memoranda of Understanding) to secure commitment for joint planning and drills.
- c. **Recommendation:** Formalize partnerships with local fire brigades, civil defense, hospitals, and emergency services for joint drills and mutual aid.

16.8 Regulatory Compliance and Auditing

- **Challenge:** Current compliance is partial and often reactive. Regulators may impose penalties for repeated violations.
- **Success Factor:** Demonstrate proactive compliance to strengthen World Bank and NEPRA confidence and reduce legal risk.
- **Recommendation:** Review and update the legal compliance register aligned with NEPRA PSC and BCP 2016. Conduct annual third-party audits for transparency and benchmarking.

ANNEX A - LIST OF ABBREVIATIONS

Abbreviation	Full Form
ABC	Aerial Bundle Cable
ALARP	As Low As Reasonably Practicable
AMI	Advanced Metering Infrastructure
BCP	Building Code of Pakistan
EDEIP	Electricity Distribution Efficiency Improvement Project
EHS	Environmental, Health, and Safety
ESCP	Environmental and Social Commitment Plan
FIMS	Fire Incident Management System
FSO	Fire Safety Officer
GIS	Gas-Insulated Substation
PESCO	Peshawar Electric Supply Company
HSE	Health, Safety, and Environment
IFC	International Finance Corporation
KPIs	Key Performance Indicators
LFS	Life and Fire Safety
LOTO	Lockout–Tagout
LT	Low Tension
MVA	Mega Volt Ampere
NFPA	National Fire Protection Association
NEPRA	National Electric Power Regulatory Authority
O&M	Operations and Maintenance
PPE	Personal Protective Equipment
SCADA	Supervisory Control and Data Acquisition
SOP	Standard Operating Procedure
TOR	Terms of Reference
T/L	Transmission Line
WBG	World Bank Group

ANNEX B - GAP ANALYSIS

The purpose of this table is to:

- Benchmark PESCO's current fire safety policies, procedures, and practices against established standards.
- Identify areas of full compliance, partial compliance, and non-compliance.
- Provide a consistent basis for recommendations and prioritization of corrective measures.

To simplify interpretation, the results of each checkpoint are categorized using a standard legend:

- Y (Yes / Fully Compliant):
Indicates that the requirement is fully met. Documented evidence and field verification confirm compliance with applicable standards.
- P (Partial Compliance):
Indicates that the requirement is only partly met. Some measures exist but are either incomplete, inconsistently applied, or inadequately documented. This represents a gap requiring corrective action.
- X (Non-Compliant / Not Present):
Indicates that the requirement is absent or significantly deficient. This presents a serious risk and demands immediate attention.

BENCH-MARK	CHECKPOINT	BUILDINGS	XMSN	GRIDS	REMARKS
Fire Safety Policy & Procedure	Check policy	Y	Y	Y	An approved fire Safety policy document is available.

BENCH-MARK	CHECKPOINT	BUILDINGS	XMSN	GRIDS	REMARKS
	Is it circulated?	Y	Y	Y	Available in the Safety Manual and PESCO website.
	Are employees aware of it?	P	P	P	Yes, Partially.
Fire Safety Organization	Check the organization	X	X	X	A dedicated fire Safety organization does not exist, however the security personnel act as first responders in PESCO Head Office.
	Is it adequately staffed?	X	X	X	X
	Is the staff qualified & trained?	P	P	P	The Head Office security staff had training.
Fire Detection Systems	Check if smoke detectors are installed in all critical areas and are functional.	X	X	X	Not installed.
	Confirm heat detectors are present in high-temperature areas	X	X	X	Not installed.
	Verify alarm systems are integrated with detection systems and are audible throughout the facility.	X	X	X	Not installed.
	Check if there is a regular schedule for testing and maintaining all	X	X	X	X

BENCH-MARK	CHECKPOINT	BUILDINGS	XMSN	GRIDS	REMARKS
	detection and alarm systems.				
	Are Heat detectors installed in areas where smoke detectors might trigger false alarms due to dust, humidity, or fumes?	X	X	X	X
	Is there any mitigation plan (Control measures) provided and implemented in case of isolation or outage of fire protection system i.e. (fire detection & alarm system)	X	X	X	X
Fire Suppression Systems	Confirm sprinklers are installed in all high-risk areas and are operational.	X	X	X	Not installed
	Ensure fire extinguishers are available, clearly marked, and regularly inspected.	P	P	P	Partial compliance, as adequate number of serviceable fire extinguishers is not available.
	Verify fire hydrants are strategically located, accessible, and maintained.	X	X	X	Not installed.
	Check for automatic suppression systems (e.g., gas suppression) in critical equipment areas.	X	X	X	Not installed.

BENCH-MARK	CHECKPOINT	BUILDINGS	XMSN	GRIDS	REMARKS
	Is there any mitigation plan (Control measures) provided and implemented in case of isolation or outage of Fire suppression systems	X	X	X	There is no fire suppression system installed.
Fire-Resistant Building Materials	Fire-resistant doors and windows are installed in all key areas.	P	P	P	Iron doors installed in some areas.
	Fire walls are constructed to contain potential fires and prevent spread.	X	X	X	Not constructed in majority of grids.
	Building materials meet national fire safety standards.	X	X	X	
	Is Fire resistance of roof structures be implemented structural stability and control of fire spread.	X	X	p	Iron doors for compartmentation installed in some areas.
Emergency Exits and Evacuation Routes	Emergency exits are clearly marked with illuminated signs.	X	X	X	Emergency exits not marked with illuminated signs.
	Evacuation routes are free of obstructions and clearly mapped out.	X	X	X	No.

BENCH-MARK	CHECKPOINT	BUILDINGS	XMSN	GRIDS	REMARKS
	Sufficient number of exits to accommodate all employees and visitors.	X	X	X	No, number of existing emergency exits in grids is inadequate
	Regular evacuation drills are conducted and documented.	X	X	X	No evacuation drills are not being conducted regularly.
	Do Exit doors open in the direction of the path of exit travel?	Y	Y	Y	Y
Fire Safety Training & Drills.	Fire safety training programs are conducted regularly for all employees.	X	X	X	No.
	Specialized training for handling electrical fires is provided to relevant personnel.	X	X	X	No.
	Records of training sessions and attendance are maintained.	P	P	P	maintained at RTC
	Regular fire drills are conducted, and their effectiveness is reviewed.	X	X	X	No.

BENCH-MARK	CHECKPOINT	BUILDINGS	XMSN	GRIDS	REMARKS
Maintenance and Inspection Schedules	Maintenance schedules for fire detection, alarm, and suppression systems are documented and adhered to.	X	X	X	No
	Routine inspections of fire safety equipment are conducted.	P	P	P	Fire extinguishers are inspected regularly.
	Logs of maintenance and inspections are maintained.	P	P	P	Date of Fire extinguishers inspection is maintained.
Emergency Response Plans	Emergency response plans are documented and accessible to all employees.	Y	Y	Y	Yes, available in PESCO Safety Manual Page No. 178- 179.
	Plans include detailed procedures for fire incidents, including evacuation, communication, and coordination with external emergency services.	Y	Y	Y	Yes
	Regular reviews and updates of emergency response plans are conducted.	Y	Y	Y	Yes

BENCH-MARK	CHECKPOINT	BUILDINGS	XMSN	GRIDS	REMARKS
Risk Assessment and Mitigation	Regular risk assessments are conducted for all areas.	P	P	P	A proper system for assessment and mitigation of fire risks is not being practiced.
	Identified fire hazards are documented and prioritized for mitigation.	X	X	X	No.
	Mitigation measures are implemented and tracked for effectiveness	X	X	X	No.
Coordination with External Emergency Services	Regular communication and coordination with local fire departments.	P	P	P	Partial, contact number of fire department is maintained for emergency contact.
	Joint drills and training exercises with external emergency services.	X	X	X	No.
	Updated contact information for local fire departments and emergency services				Available at some Grid Stations.
Documentation and Reporting	Fire safety policies and procedures are documented and easily accessible.	Y	Y	Y	Yes

BENCH-MARK	CHECKPOINT	BUILDINGS	XMSN	GRIDS	REMARKS
	.				
	Reports of fire incidents, drills, training sessions, and maintenance activities are maintained.	Y	Y	Y	Yes
	Regular audits of fire safety documentation are conducted.	Y	Y	Y	Yes