

# **PUNATSANGCHHU-I HYDROELECTRIC PROJECT AUTHORITY**

## **Emergency Action Plan (EAP)**

### **1. PURPOSE**

This Emergency Action Plan (EAP) establishes procedures for prompt and coordinated response to emergency situations during the construction phase of PHPA-I to:

- Protect human life
- Prevent structural damage
- Minimize environmental impact
- Ensure rapid restoration of safe operations
- Establish clear communication and authority lines

### **2. SCOPE**

This EAP applies to all:

- PHPA-I personnel
- Contractors and subcontractors
- Consultants
- Visitors on site

It covers emergencies occurring at:

- Dam foundation and spillway area
- Underground powerhouse and tunnels
- Pressure shafts and penstocks
- River diversion works and cofferdams
- Slope stabilization zones
- Switchyard/Sub-stations construction area
- Construction camps and site facilities including workshops/labs

### **3. EMERGENCY CLASSIFICATION LEVELS**

#### **Level 1 - Minor Incident**

Localized injury or equipment damage. Managed at site level.

#### **Level 2 - Serious Emergency**

Multiple injuries, partial slope failure, significant flood risk, underground incident. Requires activation of Project Emergency Control Room.

#### **Level 3 - Major Emergency**

Life-threatening event, large landslide, cofferdam breach, tunnel collapse, major flood, seismic structural risk. Requires district and national authority notification.

#### **4. EMERGENCY COMMAND STRUCTURE**

##### **4.1 Incident Commander (IC)**

Managing Director or designated officer

##### **4.2 Site Emergency Controller**

Chief Security Officer

##### **4.3 Emergency Response Teams (ERT)**

- Medical Response Team
- Fire & Rescue Team
- Geotechnical Assessment Team
- Evacuation & Traffic Control Team
- Communication & Liaison Team

#### **5. EMERGENCY COMMUNICATION SYSTEM**

##### **5.1 Internal Communication**

- Emergency siren system
- VHF radios
- Public address system
- Group messaging alert system

##### **5.2 External Communication**

In Level 2 or 3 emergencies, immediate notification to:

- District Administration
- National Disaster Management Authority
- Police
- Fire Services
- Nearest Hospital

Emergency contact list shall be displayed at all major work fronts.

#### **6. GENERAL EMERGENCY RESPONSE PROCEDURE**

- Identify emergency.
- Raise alarm immediately.
- Inform Control Room / Site Emergency Controller.
- Stop work in affected area.
- Evacuate non-essential personnel.
- Activate Emergency Response Team.
- Provide first aid/rescue.
- Secure site and prevent escalation.
- Document incident.

## **7. SPECIFIC EMERGENCY RESPONSE PROCEDURES**

### **7.1 Landslide/Major Slope Failure**

#### **Indicators:**

- Visible crack development
- Rapid slope movement
- Instrumentation alarm (inclinometer/extensometer)

#### **Immediate Actions:**

- Stop all work in affected zone
- Sound evacuation siren
- Evacuate to designated assembly points
- Deploy geotechnical team
- Restrict access

#### **Follow-Up:**

- Conduct slope stability assessment
- Implement stabilization measures
- Resume work only after clearance

### **7.2 Tunnel Collapse/Underground Emergency**

#### **Indicators:**

- Rock fall
- Ventilation failure
- Gas accumulation
- Structural collapse

#### **Immediate Actions:**

- Activate underground alarm
- Evacuate through designated escape routes
- Account for all personnel
- Deploy rescue team with breathing apparatus
- Maintain ventilation if safe

#### **Medical evacuation if required.**

No re-entry permitted without structural clearance.

### **7.3 Cofferdam Breach/Sudden Flood Event**

#### **Indicators:**

- Rapid rise in upstream water
- Structural instability
- Heavy rainfall warning

**Immediate Actions:**

- Immediate evacuation of riverbed works
- Shut down equipment
- Move machinery to higher elevation
- Notify downstream authorities
- Continuous monitoring of water level

Emergency flood monitoring team to operate 24/7 during monsoon.

**7.4 Seismic Event****Immediate Actions:**

- Stop all lifting and blasting operations
- Evacuate underground works
- Move to open safe zones
- Inspect slopes, foundations, and structures

Post-event structural inspection mandatory before work resumption.

**7.5 Fire Emergency****Immediate Actions:**

- Activate fire alarm
- Use nearest fire extinguisher (if safe)
- Isolate power supply
- Evacuate area

Fire & Rescue Team to coordinate with local fire services.

**7.6 Major Injury/Fatal Accident****Immediate Actions:**

- Stop work
- Provide first aid
- Inform Medical Response Team
- Transport to designated hospital
- Preserve incident scene

Incident investigation within 24 hours.

**7.7 Hazardous Material Spill****Immediate Actions:**

- Isolate spill area
- Use spill containment kits
- Prevent entry into river
- Inform Environmental Officer

Contaminated material to be disposed as per environmental regulations.

## **8. EVACUATION PLAN**

### **8.1 Assembly Points**

Clearly marked and mapped for:

- Dam site
- Underground portal
- Powerhouse
- Switchyard
- Camps

### **8.2 Personnel Accountability**

- Attendance register verification
- Contractor headcount confirmation
- Missing person(s) report to Incident Commander

## **9. MEDICAL EMERGENCY ARRANGEMENTS**

- On-site first aid center
- Ambulance available 24/7
- Trained first aiders at each work front
- Tie-up with nearest hospital
- Emergency medical evacuation route maintained

## **10. TRAINING AND MOCK DRILLS**

- Emergency drill (quarterly)
- Flood response drill (pre-monsoon)
- Tunnel rescue drill (biannual)
- Fire drill (half yearly)

Drill reports shall be documented and reviewed.

## **11. DOCUMENTATION AND REPORTING**

For all Level 2 & 3 emergencies:

- Incident report within 12 hours
- Preliminary investigation within 24 hours
- Detailed investigation report within 7 days
- Corrective and preventive action plan

## **12. RESOURCE INVENTORY**

The following shall be maintained:

- Rescue equipment
- Breathing apparatus

- Fire extinguishers
- Spill kits
- Emergency lighting
- First aid kits
- Satellite phones (if required)

Monthly inspection required.

### 13. POST-EMERGENCY REVIEW

After any major emergency:

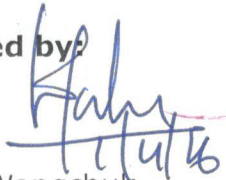
- Conduct safety debrief
- Identify root cause
- Update risk register
- Revise SOP/EAP if required
- Submit report to higher authorities

### 14. REVIEW AND REVISION

This EAP shall be:

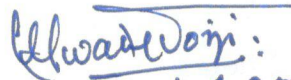
- Reviewed annually
- Updated after any major incident
- Approved by Managing Director

Prepared by:



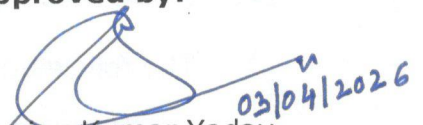
Tendin Wangchuk  
**Labour/Safety Officer**

Reviewed by:



Gorab Dorji 1.4.2026  
**Joint Managing Director**

Approved by:



Sanjay Kumar Yadav  
**Managing Director**