

Environmental and Social Monitoring Report

Project Number: 44914-014
Quarterly Report (January-March 2016)
March 2016

Pakistan: Patrind Hydropower Project

Prepared by Star Hydro Power Limited for the Asian Development Bank.

This environmental and social monitoring report is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature.

In preparing any country program or strategy, financing any project, or by making any designation of or reference to a particular territory or geographic area in this document, the Asian Development Bank does not intend to make any judgments as to the legal or other status of any territory or area.



STAR HYDROPOWER LIMITED

147 MW PATRIND HYDRO POWER PROJECT

ENVIRONMENTAL & SOCIAL MONITORING REPORT

(JANUARY-MARCH 2016)



HEAD OFFICE: House No. 534, Margalla road, Sector F10/2, Islamabad - Pakistan
Tel: +92 51 2212610-1 Fax: +92 51 2212616
E-mail: patrind@patrind.com

A COMPANY OF KOREA WATER RESOURCES CORPORATION

Table of Contents

| | |
|---|--------|
| a. Project Name and Summary Information | 5 |
| b. Relevant Environmental Permits or Compliance Certificates | 6 |
| c. Incidents of Violations or Non-Compliance | 8 |
| d. Incidents of Environmental and Safety Accidents | 13 |
| e. Labor Relations and Conditions | 19 |
| f. Environmental and Social Capacity | 25 |
| g. Stakeholder Consultation/CSR Activities | 30 |
| h. Details of community programs involving civil society/NGOs in implementation: | 30 |
| i. Compliance and Implementation of Mitigating Measures in ESMP | 33 |
| j. Resettlement Plan Implementation | 39 |
| k. Resettlement and Reconstruction | 42 |
| l. Resettlement Related Consultation and Disclosure Activities and Grievance Procedures | 42 |
| Annexures | 44-129 |

Acronyms

| | |
|---------|--|
| ADB | Asian Development Bank |
| AJK-EPA | Azad Jammu & Kashmir Environmental Protection Agency |
| KPK | Khyber Pakhtunkhwa |
| CDP | Community Development Plan |
| EH&S | Environmental Health & Safety |
| EPCC | Engineering Procurement Contracts Contractor |
| EIA | Environmental Impact Assessment |
| EMP | Environmental Management Plan |
| GRC | Grievance Redress Committee |
| IEE | Initial Environmental Examination |
| IDB | Islamic Development Bank |
| IFC | International Finance Corporation |
| ILO | International Labor Organization |
| KEXIM | Export Import Bank of Korea |
| NEQS | National Environmental Quality Standards |
| NTP | Notice To Proceed |
| PAPs | Project Affected Persons |
| PS | Performance Standard |
| RAP | Resettlement Action Plan |
| SHPL | Star Hydropower Limited |

Introduction

i. Background

The Patrind Hydropower Project is run of river project located on the boundary of Khyber-Pakhtunkhwa and Azad Jammu & Kashmir. The purpose of the Project is to provide zero-emissions renewable electricity to the grid and also provide local and global environmental benefits as well as strong local socioeconomic benefits. The project has the total capacity of 147 MW. The project is being financed by multilaterals like IFC, ADB, IDB and KEXIM.

ii. Objectives:

The purpose of this Quarterly Environmental & Social Performance Report is to describe EPC contractor's compliance with the environmental and social performance requirements of IFC/ADB (including implementation of the Environmental Management Plan) and to assess any corrective actions implemented/proposed. This includes:

- A description of all significant health, safety, environmental and social activities and events that occurred during the reporting period.
- Provision of additional information about activities (i.e., status of permits or other approvals, ongoing public consultation etc.).
- Quantitative performance monitoring data summaries in comparison to appropriate ADB and IFC policies, guidelines and national requirements.
- An explanation of any cases of non-compliance with lender's guidelines or applicable regulatory limits that have occurred, identifying the cause and the corresponding corrective measures planned or underway to prevent future occurrences.
- Resettlement Action Plan activities and progress on the implementation of project within the Sustainable Development Strategy Framework

a. Project Name and Summary Information

i. Project/Business Name

Patrind Hydropower Project

ii. Status of Construction

The Notice to Proceed (NTP) for main works was issued by the Company to EPC Contractor on December 26, 2012. However the preliminary works under Preliminary Contract were initiated in October 2010 and were dovetailed in to the main contract. As of March 2016 the physical progress achieved is 86.29%.

iii. Location of project

Village Patrind, District Muzaffarabad, Azad Jammu and Kashmir

iv. Nature

Run of river Hydropower Project.

v. Scale/size

147 MW

vi. Date of construction/operation commencement

Preliminary works commencement: September 2011

Main works start after issuance of NTP: December 2012

vii. Name, designation and signature of person responsible for preparing/reviewing the report

| | |
|---|---|
| <p>Prepared By:  Designation: Syed Atif Ali Shah Manager HSE</p> | <p>Reviewed By:  Designation: Kyung Whan Lee Deputy Chief Executive Officer</p> |
| <p>Approved By:  Designation: Waqar Ahmad Khan Chief Executive Officer</p> | |

b. Relevant Environmental Permits or Compliance Certificates

a) Summary of permit conditions and media covered:

As per NOC Issued by AJK-EPA, SHPL/EPC is bound to:

| Condition | Status of compliance |
|--|---|
| Ensure compliance to NEQS and undertake mitigation measures suggested in the EIA report & EMP. Constitute Environmental/Post EIA Monitoring Committee and submit monitoring reports on quarterly basis and provide the copy of this approval and EIA report to the contractor for information and compliance activities. | Environmental Monitoring Unit has been established and mobilized on site after the issuance of Notice to Proceed to the EPC Contractor. Quarterly E&S Monitoring reports are being submitted to the EPA AJ&K. Post EIA monitoring was undertaken by EPA during last year. Approval and EIA report is part of EPC contract. |
| Compensate PAPs for loss of agricultural land, crops, property, and usage right etc. in accordance with the rates that agreed upon and adopt appropriate mechanism for RAP grievance redress. Employ local peoples for all unskilled jobs and implement CDP sooner than later. Ensure all public utilities such as water supply pipes, power phone line be not disturbed by the execution of the project. | Owners have been compensated for the loss of agricultural land, trees and property as per the market rates/replacement cost. For unskilled jobs local workers from affected communities (Alda, Patrind, Tarcheela, Boi, Sarati Shoran and Deedal) are being employed and for skilled jobs locals are being hired on priority basis as per the requirement and the qualification. During civil works special care is being taken not to disturb any of the public utilities. |
| Ensure occupational and community health and safety backed by a comprehensive emergency response plan. Adopt controlled techniques in accordance with Pakistan explosive act and also make sure the safety & security of wild animals and their habitats at the project site and in its environs with the prior consultation and adhering to the guidelines of forestry and wild life departments strictly. | Emergency response procedures are in implementation. Provision of PPEs, education sessions, availability of medical facilities, installation of sign boards and close supervision by EPCC & OE HSE staff are ongoing activities to ensure Occupational health and safety on project sites. Blasting activities are carried out in accordance with Pakistan Explosive Act. Monitoring of Fish fauna and flora has been undertaken during quarter. |
| For compliance of regulation 13, 14, 17 & 18 of IEE/ EIA regulations 2000 which enunciate the conditions for approval. Confirmation of compliance, entry, inspection and monitoring of the proposed project. The site to install the asphalt plant and other machinery would be selected in consultation with the agency (AJK- EPA). The findings of quality analysis on regular basis should positively be shared. Also, the spoil should be dumped at pre identified location. | Quality monitoring reports are being sent to EPA-AJK. Spoil is being dumped on approved sites. Installation of batching plant has been undertaken with consultation of EPA-AJK. |

Communicate any change in the approved project to AJK-EPA and that would be commenced after obtaining the approval. The approval shall stand null and void if the conditions mentioned herein before are not fully complied with. It does not absolve the proponent of the duty to obtain any other approval or clearance that may be required and can be withdrawn at any time with any prior notice if deemed necessary in the public interest.

For the changes in the design of the weir site layout and Addendum to the EIA report was submitted to both the EPAs i.e. EPA AJ&K and KP covering the changes to be made in the design which was subsequently approved by both the EPAs on November 19, 2014.

Most of the conditions are common in both approvals with few exception of following issued by EPA KPK:

| Condition | Status of compliance |
|--|---|
| Water in the pond created by construction of Patrind weir should be maintained at EI765m.amsl. Safety zone/adequate engineering measures should be provided to overcome fears of the residents regarding effects of pond to their houses. The level difference of 2 meter from 765m.amsl to 767m will act safety zone so the owner of the land and housing structures falling within the zone should be compensated as per laid down procedure of compensation of the government. | The operation level of the Project is at 765 masl. The Company acquired the land at the level of 767 masl as per the condition of the EPA. The additional 2 meters shall act as safety zone and the owners were compensated as per the procedure. |
| The project management should contribute towards the repair of the road to be used during construction and operation activities of the project. The trees supposed to be submerged should be counted in the presence of all stake holders i.e. owners land collectors /patwari representing revenue department representative of EPA and forest/agriculture department. After the determination of exact number type and ownership of the trees be finalized and paid as per laid down procedure of the government | The owners have been compensated for the trees supposed to be acquired due to the land acquisition. The trees were counted in the presence of all stake holders i.e. owners land collectors /patwari representing revenue department representative of EPA and forest/agriculture department. Uneven section of project access road passing through Sarati village has been repaired with graders. Damaged portion, will be repaired if any. The maintenance of the access roads near the project area is part of Social uplift plan |
| Minimum flow of 2 cumecs in the downstream of weir in Kunhar River should be kept and provision for 10% extra of this amount of water for emergency in downstream should also be kept in plan. No extension would be permitted in the future in existing hydropower project without prior approval of the EPA /government of Khyber Pakhtunkhwa | Shall be applicable during the operation phase of the Project |
| Separate NOC is required for batching/crushing Plant | NOC was obtained from EPA KPK for installation of two batching plants near the weir site |

b) Relevant Government Agencies

As the Project is located on the boundary of Khyber Pakhtunkhwa and Azad Jammu & Kashmir, Star Hydro Power Limited (the “Company”) had to seek approval of Environmental Impact Assessment (EIA) from following two Environmental Protection Agencies (EPAs).

- i. EPA Azad Jammu and Kashmir
- ii. EPA Khyber Pakhtunkhwa

c) Issuance dates and duration of validity

| Issuing Authority | Issuance Date | Duration of Validity |
|-------------------|---------------|----------------------------|
| EPA-AJK | 10-08-2010 | 3 years |
| EPA-KPK | 14-04-2011 | Project construction phase |

d) Renewal Requirements:

As per AJK-EPA review of IEE and EIA Regulations, 2009 “Once the Environmental Approval is accorded in favor of the proponent, shall be valid for the period of 3-years from the date of issuance. However, if construction is commenced during the 3 years period, the approval shall stand extended "automatically" for a further period of 3-years from the date of expiry of initially issued Approval”.

c. Incidents of Violations or Non-Compliance

HSE compliance monitoring has been undertaken as per usual during the reporting quarter. To ensure implementation of recommended procedures regular liaison was maintained with the EPC contractor and OE and subsequently with the site construction teams and sub-contractors. Efforts were made to ensure remedial and corrective actions highlighted by the Company and OE to mitigate HSE issues.

Incidents of violations and non-compliances by EPCC and its sub-contractors were included in daily, weekly and monthly reports. To prevent incident and mitigate risks, during the quarter, close supervision by HSE team has been carried out. Following non conformities were highlighted by OE through correspondence and during formal or informal meetings. Remedial measures and corrective actions have been undertaken mitigation measures:

- In January, penstock road was being prepared for the shifting of steel lining. Construction team has dumped all the soil nearby river so corrective action was taken and removed all the soil from that site with the help of excavator and dump truck and discarded into the disposal area.



- During the month of February it has been observed that the ratio of dust generation has been increased due to the changing of weather. So, corrective action was taken by issuing water sprinkling schedule to the batching plant supervisor and asked him to follow the schedule to overcome the dust issues.



- In the month of March, new waste trench has been constructed to ensure the proper disposal of waste. Trench is constructed according to the method statement with liners including concrete, clay and geo membrane that will make a barrier between the waste and the environment. It is prepared with a typical depth of 8m and length of 15m. It has 20cm concrete layer, 6 inches of clay liner then 1 mm thickness of geo membrane liner having tear resistance of 6.5. The primary purpose of the lining is to isolate the landfill contents from the environment and, therefore, to protect the soil and ground water from pollution originating in the landfill. Furthermore, soft barrication is placed

around the trench with proper dyke and access for the waste collector to dispose the waste.



Excavated Waste trench



Concrete lining of 6cm



Clay lining of 6 cm



Installation of Geo-Membrane Sheet (1mm)



Complete installation of Geomembrane



Soft Barrication around the trench

- Due to the construction of drainage system the sedimentation tank process affected because construction team have diverted sedimentation tanks water from its original path towards O & M building so corrective action was taken and made new sedimentation tank in front of O & M building in order to avoid release of contaminated water into the river.



- In Kyung dong accommodation there are some taps, valves and regulators which are not properly fixed so water impending from those valves was going into the containers, creating problems for the labors living in the Kyungdong camp. HSE department asked Kyung Dong management to repair them or change in order to avoid the depletion of water resources.



Un-safe Act & Un-safe Conditions

To mitigate risks of accidents UA/UC Observation Card System was introduced to ensure maximum safety on site. To sensitize all staff/workers and to get information and feedback about site HSE issues, boxes holding UA/UC cards have been placed on prominent locations.

Warning Letters for Non Compliances

During reporting period, depending on nature and severity of violation warning letters have been issued. Verbal warning is given for the first time on minor violations. If any employee fails to abide by HSE policies after verbal warning a written warning letter is issued. 14 warning letters were issued for incident for violations of HSE procedures. List of warning letter is given in the table below. As per company's standard procedure after three warnings employee would not be able to continue his/her job. However, before removal it is important to ensure that individual has been informed / trained and provided with the necessary PPEs.

WARNING LETTERS

| Sr. | Name | Date | | | Site | Company | Designation | Reasons |
|-----|-----------------|------|-------|------|-----------------|--------------------------|-------------|-------------------------------------|
| | | Day | Month | Year | | | | |
| 1 | Tariq | 27 | 01 | 2016 | Weir Site | Daewoo E&C | Rigger | PPEs Violation |
| 2 | Ahfu | 15 | 02 | 2016 | Powerhouse Site | CNEEC | Supervisor | PPEs Violation |
| 3 | Muhammad Faizan | 20 | 02 | 2016 | Powerhouse Site | Daewoo | HSE Officer | Absence from Duty |
| 4 | Zakir Awan | 17 | 02 | 2016 | Weir Site | Sungbo | Carpenter | Work at height without Body Harness |
| 5 | Mureekh | 17 | 02 | 2016 | Weir Site | Sungbo | Rigger | Unsafe Act |
| 6 | Shahid Abbasi | 17 | 02 | 2016 | Weir Site | Sungbo | Carpenter | Work at height without Body Harness |
| 7 | Hamza Malik | 17 | 03 | 2016 | Powerhouse Site | Kyungdong | Labor | PPEs Violation |
| 8 | Haseeb | 27 | 03 | 2016 | Powerhouse Site | Daewoo Architecture Team | Foreman | Duty Negligence |
| 9 | Moin | 27 | 03 | 2016 | Powerhouse Site | Daewoo Architecture Team | Foreman | Duty Negligence |
| 10 | Abdul Raheem | 27 | 03 | 2016 | Powerhouse Site | Kyungdong | Operator | PPEs Violation |

| Sr. | Name | Date | | | Site | Company | Designation | Reasons |
|-----|---------------|------|-------|------|-----------------|--------------|-------------|----------------------|
| | | Day | Month | Year | | | | |
| 11 | Faizan Ali | 31 | 03 | 2016 | Powerhouse Site | Daewoo E & C | HSE Officer | Duty Negligence |
| 12 | Adeel | 09 | 03 | 2016 | Weir Site | Sungbo | Engineer | PPEs Violation |
| 13 | Shahbaz Malik | 28 | 03 | 2016 | Weir Site | HES Pak | Driver | Unsafe Act |
| 14 | Naseem | 28 | 03 | 2016 | Weir Site | HES PAK | HSE Officer | Failure to supervise |

No. of Warning letters issued in each month



d. Incidents of Environmental and Safety Accidents

a) Environmental Accidents and Mitigation

- During the quarter, minor oil spillage was observed in front of the batching plant, power house and in workshop area due to the maintenance of the machinery and generators placed on the site. Corrective actions were taken immediately in this regard to stop oil spillage by removing the top layer of contaminated soil and dumping into the concrete waste trench in the disposal area to prevent environmental degradation.



- Beside Kyung dong accommodation sewage lines were impassable due to which all of the sewage water was curving on the road by creating foul smell which is directly affecting the populates living around and degrading surroundings environment. In this regard corrective action was taken by making another settling tank with soak pit to avoid environmental degradation.



Following preventive and mitigation measures are adopted;

- Filter cartridges of the water filtration plant were changed on both the sites to ensure clean drinking water.
- Shotcrete activities have been undertaken to stabilize slopes and to mitigate risk of erosion and to minimize landslide risk.
- Excavated material is being dumped in designated disposal areas on both sites.
- According to the nature of work inspections have continuously been carried out during the reporting period to reduce the risk of accidents and impacts on environment and for proper maintenance of machineries and other equipment's.
- Quarterly Fish fauna and vegetation monitoring to have been undertaken.
- Bi Annually Water Quality Analysis to have been undertaken in the 4th quarter.
- Hunting and fishing activities are prohibited on project sites.

b) Health and Safety Accidents and Mitigation

EPCC encourages and educates employees to take reasonable care for their own health and safety. Incidents are recorded for all workers/staff working for subcontractors and on rented vehicles/machinery.

Summary of health and safety incidents during quarter is in the table given below.

| Incident | Frequency | Description | Media or Community Reaction |
|------------------------|------------------|--|------------------------------------|
| Fatality | None | None | None |
| First Aid Case | None | None | None |
| Medical Treatment Case | 6 | <ol style="list-style-type: none"> 1. On Wednesday, 27 Jan 2016, around 11:00 am, KD Worker (Mr. Kabeer) who was involve in lifting work in link tunnel. Crane was lifting the H-Beam when he gave him signal to lift up but by mistake he lower the beam instead of upward. During this activity beam strike on the Kabeer's right foot and he got injured his toe. He immediately moved to site clinic and after first aid shifted to nearby hospital for further treatment where doctor took his X-ray and give him necessary medical treatment and advise him to take rest. 2. On 29th Jan 2016, during the work in block 4 basement in power house, Mr. Sageer (KD Meson) got minor injury through the penetration of rusty nail in left foot. He immediately shifted to site clinic for first aid. After couples of days, he felt pain in same foot and went to nearby hospital for specialist checkup where doctor admit him and operated the infected area of foot and suggest him bed rest. 3. On 1st February, 2016 Carpenter foreman Muhammad Ilyas was working under lining form. A wooden piece fell from height of almost 3 meters and struck his left knee. He got injured and shifted to the hospital for further treatment. 4. On 2nd February, 2016 Carpenter Syed Mushtaq Husain was working in the link tunnel, during passing through the steel rods he tripped and fell down on structure of steel rods. Got injured his left side ribs. Immediately shifted to site clinic and then referred to CMH. 5. On 22nd February, 2016 Labor Khursheed was moving the sheets and his feet stuck with the steel road and he | None |

| | | | |
|---|------|--|------|
| | | <p>got injury on his left leg, sent to the clinic and then referred to hospital for further treatment</p> <p>6. On 28th march 2016, Kyung Dong wheel Excavator was moving towards HRT, on reaching stone pitching area, it fell down from slopes due to brake failure. Operator got minor injuries and shifted to hospital for further treatment.</p> | |
| Damage only incident and Near Miss | None | None | None |
| Property damage/environmental incident | 01 | <p>1. On 19th February, 2016 Fire incident happened due to placement of fuel cane inside accommodation. Fire controlled in a time span of 45 minutes' total. During firefighting incident heavy equipment officer got suffocation because of smoke and one policeman got minor injury on hand, both were given immediate first aid.</p> | None |
| Medical Checkup / Examination / Treatment | 3105 | <p>January 2016: Lower site = 810 Upper site = 558 Total= 1368 FEB Lower site = 610 Upper site = 334 Total= 944 March Lower site = 550 Upper site = 243 Total= 793</p> | None |

Safety Milestone

4.7 million Safe Man Hours were completed in the reporting quarter.

External Monitoring /Inspection

Sites HSE internal inspection has remained an ongoing activity. As part of external monitoring, The Lenders (IFC, ADB & KEXIM) Environmental & Social Monitoring Team visited the site on 17th February, 2016. Lender's Environmental & Social Monitoring Mission Subsequently Star Hydro and technical advisor Mott MacDonald also visited on site and raised some issues which later on rectified by the concerned departments, other visits from

Daewoo head office approaching time to time and inspecting sites.



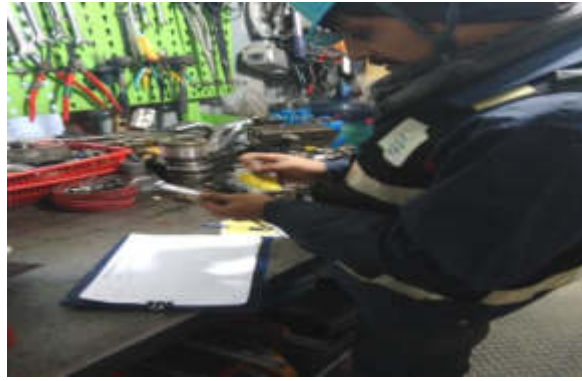
Internal Inspections Conducted During Reporting Period

To mitigate safety incidents, machinery, equipment and electrical appliances are being inspected to ensure fitness through color coding system. List of inspections done during the quarter are attached as (**Annex- 1**).

According to the nature of work being carried out on construction sites, inspections have continuously been carried out during the reporting period to reduce the risk of accidents and impacts on environment and for proper maintenance of machineries and other equipment regularly.

Following inspections have been undertaken during quarter;

- Heavy equipment inspection
- Batching Plant Inspection
- Site Overall Inspection
- Fire Extinguisher Inspection
- Health and Hygiene Inspection
- Gaseous concentration Inspection



Mitigation Measures

To ensure health and safety of both staff and labor on project area, following were some of the prominent activities EPCC undertook during the quarter:

1. Workers (attached with both Daewoo E&C and sub-contractors) have been provided with necessary Personal Protective Equipment (PPE) comprising of helmets, safety shoes and safety jackets and ankle belts to prevent injuries.
2. Warning letters have also been issued to the personnel found to perform activities that are against the rules and regulations of the HSE.
3. Newly employed staff, labor and daily wagers were given HSE inductions so that they are aware of potential risks associated with the construction sites emergency procedures.
4. Safety campaigns and awards are distributed to encourage and develop safe work behavior in labor and staff.
5. To mitigate safety incidents, machinery, equipment and electrical appliances are being inspected to ensure fitness.
6. Regular trainings/education sessions for staff and labor.
7. Water sprinkling on project access road for community health and safety.

Permit To work (PTW)

Permit to work for the following activities have been issued during the quarter.

1. Welding/ Open Flame Work
2. Excavation
3. Lifting
4. Explosive issue
5. Blast
6. Work at height

Work permits issued during the reporting quarter are attached as **Annex-2**.

e. Labor Relations and Conditions

(i) Nature of labor dispute or grievance

No labor dispute or conflict with local community was observed or reported during quarter. No complaints were received from the workers during the reporting quarter. Complaints box are positioned on each site on detectable location for the ease of labor in submitting complaints. Details of the complaints received are annexed as **Annex 12**.

(ii) Legal requirements, Permit conditions and renewal requirements

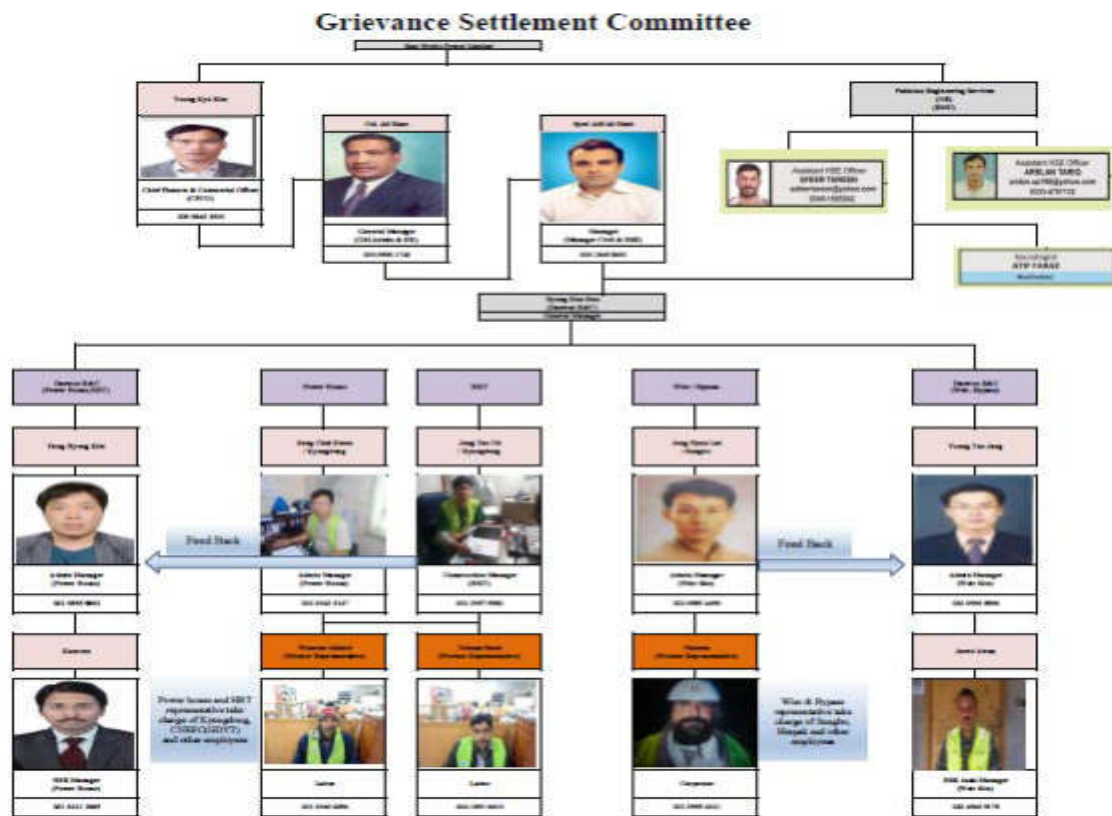
During the reporting period, requirements related to labor's contracts, permits and other conditions remained constant and no change was observed.

EPCC and sub-contractors are providing insurance coverage in case of accident and death. Furthermore, a deduction is being made from salaries for Employees Old Age Benefits Institution (EOBI) as social security on KPK side

(iii) Authorities in charge of investigation/recording

In case of any labor incident, Site Construction Manager and HSE staff is responsible to record, investigate and address it appropriately.

To address any dispute or work related complaint received from staff /workers. Internal Grievance settlement Committee (GRC) comprising four representatives from labor one from each subcontractor, Planning Manager, Admin Manager and HSE Manager is mandated to investigate the matter in an unbiased manner and resolve it amicably so that the concerned party or individual may be satisfied and a friendly / peaceful environment is reinstated at project site.



(iv) Corrective actions, deadlines, identification of responsible parties.

SHPL, OE and EPCC's HSE departments continuously indicates corrective actions for further compliance by construction team.

(v) Labor relations and living conditions for construction labor force

All staff/workers before induction have been educated to respect local norms and never involve in any conflict with locals. Furthermore, community liaison officer / coordinator who have been employed from local area, assist in managing these accommodations. Basic services like electricity, water and gas have been provided. Safety measures such as fire extinguishers and emergency contact numbers have been placed on main locations. Fire alarm system has been installed on main campus lower site and will be installed on new accommodations as well. Ambulance drivers are aware of all accommodations to have prompt access in case of any emergency. Following standards are implemented for adherence of local Labor standards:

- Government of Pakistan Labor Policy 2010.
- Standards for labor health and safety are executed according to EPC Construction

Contract.

- EPC has made all necessary arrangements for payment, housing & feeding.
- The living conditions are up to merit with all necessities.
- Prefer to hire unskilled /skilled staff and labor from AJ&K or KP.

Compliance status based on applicable National and International laws/ regulation on labor including ILO core labor standards

As per conditions stipulated in the Project construction contract between Company and EPC contractor those have been made in light of National and International laws and standards, implementation during the quarter has been observed accordingly. Statuses of compliance with these laws are given in the table below;

Table: Compliance Status with International and National Labor Laws/Regulations

| CONTRACTUAL TERMS/ CONDITIONS | STATUS OF COMPLIANCE DURING QUARTER |
|---|--|
| ENGAGEMENT OF STAFF AND LABOR | |
| Except as otherwise stated in the Project Requirements, the Contractor shall make arrangements for the engagement of all staff and labor, local (People living in project vicinity) or otherwise, and for their payment, housing, feeding and transport. | EPC contractor has made all necessary arrangements for the engagement of staff and labor and payment for their wages/ salaries, housing, feeding and transport. However, the local staff/workers do not need accommodation on project base camp. |
| The Contractor and its subcontractor(s) shall prefer, to the extent practicable and reasonable, to hire unskilled staff and labor, and skilled staff and labor with appropriate qualifications and experience, who are residents of AJ&K or KP especially who are the affected of the Project | More than 200 of unskilled jobs have been provided to nearby communities (Alda, Thori, Patrind, Tarcheela, Sarati, and other adjacent localities). Also preference has been given to local people who qualify for skilled positions |
| The Contractor shall, and shall ensure that its subcontractors shall, fulfill and observe the Environmental and Social Requirements in relation to the engagement of staff and labor | EPC Contractor has established a proper mechanism of daily and weekly reporting and consistent monitoring of HSE and related social issues. On the basis of recommendations, corrective measures are being taken accordingly |

RATES OF WAGES AND CONDITIONS OF LABOR

The Contractor shall pay rates of wages, and observe conditions of labor, which are not lower than those established for the trade or industry where the work is carried out or as prescribed under the Laws of the Country. If no established rates or conditions are applicable, the Contractor shall pay rates of wages and observe conditions which are not lower than the general level of wages and conditions observed locally by employers whose trade or industry is similar to that of the Contractor.

The minimum salary for the permanent worker is 13,000/- for 208 hours monthly according to the budget notification 2015 plus food and accommodation if required.

PERSONS IN THE SERVICE OF OTHERS

The Contractor shall not recruit, or attempt to recruit, staff and labor from amongst the Employer's Personnel.

Full compliance of the condition was observed during entire quarter

LABOR LAWS

International Human Rights & Core Labor Standards The Contractor shall comply with all the relevant labor Laws applicable Contractor's Personnel, including Laws relating to their employment, health, safety, welfare, immigration and emigration, and shall allow them all their legal rights.

All regulations are in implementation. Local labor laws were devised in light of International Human Rights & Core Labor Standards; therefore, compliance with local standards is same with international laws /standards. Furthermore, Pakistan has ratified ILO's conventions on core labor standards.

The Contractor shall require its employees to obey all applicable Laws, including those concerning safety at work.

Site HSE status has been improved due to regular instructions and corrective measures.

Abolition of child labor

To ensure the abolition of child labor the Computerized National Identity Card (CNIC) has been made mandatory for induction which is only provided by the GOP after the age of 18.

Elimination of all forms of forced or compulsory labor

No forced labor observed /reported during quarter. Furthermore, during site inspections by SHPL, OE and EPCC's HSE staff, it is strictly checked that no forced labor has been undertaken on any site in any form.

Elimination of discrimination in respect of employment and occupation

No discrimination exists as all persons have been provided equal opportunities irrespective of color, race, origin and nationality. Only difference is the nature of job and relevant skills.

| | |
|--|--|
| Freedom of association and the effective recognition of the right to collective bargaining | No ban is imposed on workers with regard to establishment of workers organization or freedom to express labor concerns. However, formal labor union or association has yet not been established. |
|--|--|

WORKING HOURS

| | |
|--|---|
| <p>No work shall be carried out on the Site on locally recognized days of rest, or outside normal working hours, unless:</p> <p>(a) Otherwise stated in the Contract,</p> <p>(b) the Employer gives consent, which shall not be unreasonably withheld, or</p> <p>The work is unavoidable, or necessary for the protection of life or property or for the safety of the Works, in which case the Contractor shall immediately advise the Employer</p> | Work has been carried out on weekends but only with the consent of concerned staff/labor. |
|--|---|

FACILITIES FOR STAFF AND LABOR

| | |
|---|---|
| (a) Except as otherwise stated in the Project Requirements, the Contractor shall provide and maintain all necessary accommodation and welfare facilities for the Contractor's Personnel. The Contractor shall also provide facilities for the Employer's Personnel as stated in Project Requirements. | Recommended facilities have been provided |
| (b) The Contractor shall not permit any of the Contractor's Personnel to maintain any temporary or permanent living quarters within the structures forming part of the Permanent Works. | Nobody has been permitted during reporting period |

(vi) Medical facilities provided to Staff and Labor during quarter:

On both sites all time availability of clinical staff and facilities has been insured. During quarter 3105 staff and workers visited medical facilities. However, majority of all visitors having normal check up with very few exceptions of minor cuts but rest of other are minor health issues like gastro enteritis, flue and headache etc. Availability of first aid boxes has also been ensured at all sites Implementation of local labor standard.

(vii) Project procedures for: (a) hiring; and (b) acquisition of goods and services:

Procedures for hiring have been adopted as per EPCC's policy and also in compliance with EPC Contract. While, procurement of goods and services by EPC contractor is being carried out under Quality Assurance and Quality Control plan.

(viii) Local Employment Status:

As per the EPC contract, EPCC is bound to employ unskilled labor from local areas/ adjacent villages and for skilled jobs preference has to be given to the qualified locals.

LOCAL EMPLOYMENT STATUS

| Company | AJ&K | | | | | | | KPK | | | | | | Others | Total Employees |
|----------------|-------|-------|---------|----------|--------|------------|-----------|--------|--------|--------|--------|--------|-----------|--------|-----------------|
| | Alrah | Thori | Patrind | Tarshila | Shoran | Other AJ&K | Sub-Total | Sarati | Boi | Deedal | Dalola | Others | Sub-Total | | |
| Daewoo | 2 | 40 | 15 | 4 | 1 | 177 | 248 | 2 | 10 | 1 | 25 | 40 | 78 | 86 | 412 |
| Kyung Dong | 17 | 22 | 10 | 2 | | 584 | 635 | | 1 | 5 | 4 | 44 | 52 | 54 | 741 |
| Sungbo | | | 55 | 20 | 24 | 151 | 231 | | 80 | | 117 | 85 | 294 | 16 | 541 |
| CNEEC | 1 | | | | | 5 | 7 | | | | | | - | 0 | 7 |
| Daskwang | | | | | | 1 | 1 | | | | | 2 | 2 | 2 | 5 |
| Hespek | | | | | | 15 | 16 | | | | | 25 | 26 | 0 | 42 |
| Watch Man | | | 2 | | | | 2 | | 17 | | | | 17 | 0 | 19 |
| Guard & Guides | | | | | | 35 | 36 | | | | | | - | 0 | 36 |
| Total | 14 | 72 | 81 | 26 | 25 | 951 | 1176 | 2 | 117 | 4 | 146 | 200 | 469 | 158 | 1803 |
| | 1.62% | 6.12% | 7.68% | 2.21% | 2.15% | 86.87% | 65.22% | 0.43% | 24.95% | 0.87% | 31.15% | 42.64% | 26.01% | 8.76% | 100.00% |

Compliance with legal requirement for employment

| Project Legal Agreement/Contract | Conditions/Requirements | Compliance Status |
|---|---|--|
| EPC Contract Section 6.1 "Engagement of Staff and Labor" | "The Contractor and its subcontractor(s) shall prefer, to the extent practicable and reasonable, to hire unskilled staff and labor, and skilled staff and labor with appropriate qualifications and experience, who are residents of AJ&K or KP especially who are the affected by the Project" | Nearly 85% of man power is employed from local areas (AJK 65% & KPK 26%). |
| As per Para 5 (n) of Environmental approval issued KPK EPA Approval Condition | "Non-technical jobs should be provided to the local community. Employment record for all positions shall be provided to EPA-Khyber Pakhtunkhwa and priority should also be given to local in technical jobs but not at the cost of merit or requirement of the management of the project" | Unskilled jobs have been provided to local residents whereas preference has been given to locals for technical positions but subject to availability. |
| As per condition (xii) stipulated in Environmental approval issued by AJK EPA | "As far as possible, employment should be provided to local people for all unskilled jobs. Preference may also be given to local people for all semi- skilled and skilled jobs. Employment record for all positions shall be provided to AJK-EPA positively" | Employment opportunities have been disclosed to the local communities through different avenues such as newspapers advertisement, public notice on prominent locations and through community coordinators and local project staff. Preference has been given to the locals subject to availability of skilled and unskilled human resources. |

f. Environmental and Social Capacity

i. Staff capacities in environmental and social management (as relevant)

The Project is being managed/ monitored by EPCC/OE/SHPL having a balanced team of HSE staff comprising safety, environment and health professionals. Organizational chart of EPC is attached as **Annex-3**. An orientation to environmental management, health and safety during construction work is part of induction form of all the staff and workers hired. Furthermore, daily HSE monitoring, toolbox meeting programs and other related activities raise the awareness level among all staff and workers.

ii. HSE Weekly Meetings:

As per monthly HSE Plan (attached as **Annex-6**) of EPC contractor, weekly internal meetings and meetings with site construction teams have regularly been conducted on both sites list of meetings is attached as **Annex-4**.



Issues regarding compliance with HSE standards have always been main agenda items during the meetings.

iii. Environmental laws and regulations

EIA study of the project was completed in light of following laws and regulations. EMP as part of EIA is in implementation under the same laws and regulations;

- Pakistan Environmental Protection Act 1997
- National Environmental Quality Standards (NEQS)
- AJK Environmental Protection Act 2000
- Land Acquisition Act 1894
- Draft National Resettlement Policy 2002
- NWFP Forest Ordinance 2002
- Sarhad National Conservation Strategy 1992
- ADB Safeguard Policy Statement 2009
- IFC Handbook (Resettlement Action Plan)

iv. Safety Training and Campaign

Capacity building activities coupled with effective supervision is always result oriented. Regular HSE trainings are conducted for project employees on different subjects. These trainings are conducted in the light of standards guidelines and procedures developed by Daewoo E&C for its project while working across the globe, however, site specific

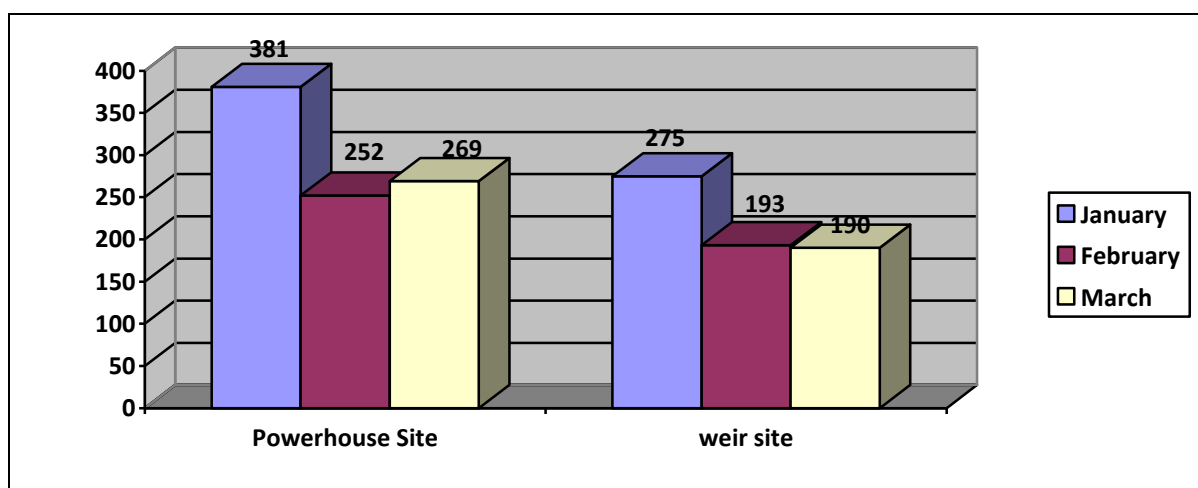
modifications have been made in manual. In the month of December, 2015 “SAFETY PAUSE” campaign was held and motto of the campaign was to put their best efforts to make sure the proper implementation of HSE procedures on site in order to make 2016 free from incident. List of the trainings and campaigns undertaken during the quarter is attached as (Annex-5).



v. Induction Training

As part of EMP all staff and workers before starting their respective jobs have been given induction training as per “Induction Performa” recommended in EMP document. The induction trainings done during the quarter is given below;

| Months | Total No of Induction Trainings | | Total No. of employees inducted | |
|----------|---------------------------------|------------|---------------------------------|------------|
| | Lower Site | Upper Site | Lower Site | Upper Site |
| January | 45 | 33 | 381 | 275 |
| February | 47 | 28 | 252 | 193 |
| March | 67 | 44 | 269 | 190 |



Tool Box Meetings

This is a constant activity undertaken daily by EPCC before the start of every construction shift and is part of 3.5 Safety Campaign. Daily HSE related matters are conveyed to all staff and labor during the meeting by HSE staff.

Daily Education/Training on site

During frequent site visit on spot education/training is an ongoing activity that certainly enhance and promote safety culture on sites.

Moreover, during inspection of equipment and color coding activities, workers and relevant staff has also been educated appropriately. Safety Campaign as part of monthly HSE Plan has been conducted during quarter on both sites.



Monthly Safety Award

Safety campaigns were arranged to promote and develop safe work behavior among labor and staff. To promote safety culture on sites, as per usual safety awards given during month of reporting period:



Safety Awards

| Sr. No | Name | Company | Award | Location |
|--------|---------------------|---------------|---------------------|-----------|
| 1 | Shaukat Rasheed | Daewoo E&C | Best Geologist | P/H Site |
| 2 | Muhammad Kamran | Daewoo E&C | HSE Officer | P/H Site |
| 3 | Malik Shehzad Asalm | Daewoo E & C | Male Nurse | P/H Site |
| 4 | Wasim Akram | Daekwang E&C | Best Carpenter | P/H Site |
| 5 | Safdar Abbas | Kyungdong E&C | Best Foreman | P/H Site |
| 6 | Wei Zhonghua | CNEEC | Best Safety Manager | P/H Site |
| 7 | Sadiq Abbasi | DAEWOO E & C | Best Labour | P/H Site |
| 8 | Khan Muhammad | Kyungdong E&C | Best Electration | P/H Site |
| 9 | Muhammad Siddique | Sungbo E&C | Best Worker | Weir Site |
| 10 | Mohsin | Sungbo E&C | Best Labour | Weir Site |

Needs assessment of environmental and social management capacity

As ongoing activity, continuous capacity building initiatives including more specific trainings on environment and social management are required for staff and labor. Furthermore, daily HSE monitoring, toolbox meeting programs and other related activities have raised the awareness level among all staff and workers.

EPCC's HSE department delivered orientation sessions, awareness raising and capacity building sessions on environment and social management and also identified following training needs of the staff and labor during the next quarter.

- i. Hot Work Safety;
- ii. Confined Spaces;
- iii. Waste Management;
- iv. Chemical Safety.

g. Stakeholder Consultation/CSR Activities

To initiate and sustain constructive external relationships with Project stakeholders particularly with adjacent /local communities, consultation is an important tool to enhance the social performance of the Project.

Meetings and discussions were held with local NGOs and government departments (Environment Protection Agency, district administration and development authority Muzaffarabad).

h. Details of community programs involving civil society/NGOs in implementation:

- Some professional services on quarterly basis are being hired by EPCC from locally based individuals and organizations during the quarter .Following organizations have been engaged to undertake activities under EMP and Social uplift Plan:
- HSE sign board preparation and printing activity requirements of the project is being undertaken by local vender (Add City) owned by Mr. Khursheed Qureshi, resident of Patrind village. Add City owner Mr. Khursheed is president of Kunhar Welfare Organization and he himself and rest of his partners are PAPs who are linked with same organization.
- Flora and Fauna Study by local Fisheries and wildlife expert Mr. Yousaf Qureshi who is also retired Director Fisheries Government of AJK.

Table: Organizations/NGOs consulted during the quarter

| Organization Name | Location | Purpose/ issues discussed | Actions to address Issues |
|--------------------------------------|--------------------------------|--|---|
| Kunhar Welfare Organization | Patrind- (Upper Site AJK Part) | EPCC is in constant liaison with the organization regarding preparation of awareness material. | During quarter, HSE sign board preparation and printing activity is being undertaken by local vender (Add City) owned by Mr. Khursheed Qureshi, resident of Patrind village who is president of Kunhar Welfare Organization and he himself and rest of his partners are PAPs who are linked with same organization. Therefore, all printing works are allocated to same organization. |
| Pakistan Red Crescent Society (PRCS) | Muzaffarabad- (Lower Site AJK) | Placement of First Aid Trained Ambulances Drivers for night shift+ Fitness /service of both ambulances. | First Aid trained drivers placed on night shift and ambulances were sent for service and maintenance by PRCS. |
| Edinburgh DIRECTAID | Muzaffarabad- (Lower Site AJK) | Environmental monitoring reports submitted by the NGO were discussed to address and incorporate the comments/recommendations made by the owner engineer. | Environmental monitoring activities are being organized by local NGO Edinburg Direct Aid |

Rental Vehicle and Heavy Equipment Summary

| Company | AJ&K | | | | | | | KPK | | | | | | | | Total |
|-----------------|-------|-------|---------|----------|--------|---------------|---------------|--------|-------|--------|--------|--------|---------------|--------|-----------|---------|
| | Alrah | Thori | Patrind | Tarshila | Shoran | Other AJ&K | Sub- Total | Sarati | Boi | Deedal | Dalola | Others | Sub- Total | Others | Sub total | Hired |
| Daewoo | 1 | 1 | 2 | 3 | | 6 | 13 | 4 | 1 | | 2 | 1 | 8 | | 16 | 29 |
| Kyung Dong | | | | | | 16 | 16 | | | | | 15 | 15 | 3 | 33 | 49 |
| Sungbo | | | 4 | | | 2 | 6 | 4 | 2 | | 3 | 1 | 10 | | 20 | 26 |
| Naveed Brothers | | | | | | 4 | 4 | | | | | | - | | | 4 |
| Hespak | | | | | | 3 | 3 | | | | | | - | | | 3 |
| DaeKwang | | | | | | 1 | - | | | | | | - | | | - |
| Total | 1 | 1 | 6 | 3 | 0 | 32 | 42 | 8 | 3 | 0 | 5 | 17 | 23 | 3 | 69 | 111 |
| | 2.38% | 2.38% | 14.28% | 7.14% | 0.00% | 73.90% | 37.83% | 1.15% | 4.34% | 0.00% | 7.24% | 24.63% | 33.33% | 4.34% | 62.16% | 100.00% |

i. Compliance and Implementation of Mitigating Measures in ESMP

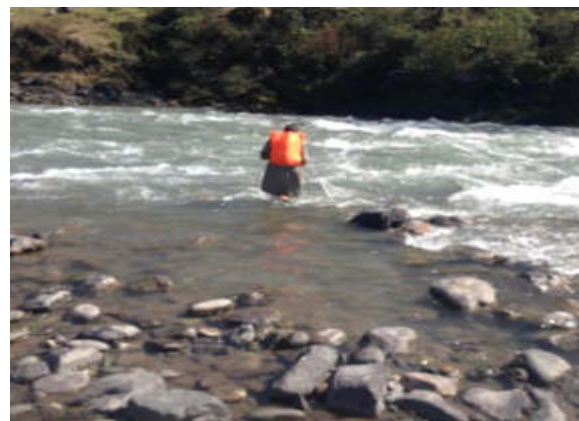
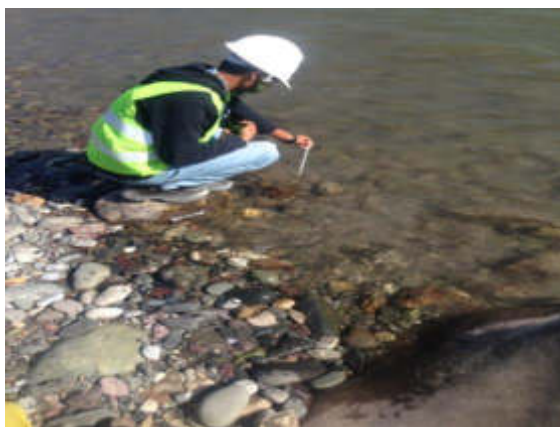
Compliance monitoring of environmental and social management plan has been an on-going activity undertaken by OE and EPCC's HSE staff on both sites. Non compliances with recommended standards and regulations were recorded and reported daily, weekly and monthly. EMP Compliance status is attached as **Annex-7**.

a. Environmental monitoring under EMP:

Internal Environmental and Inspection checklist is developed and being filled on daily bases. Besides this following activities have been undertaken as part of environmental monitoring:

i. Fish fauna Study Monitoring:

Quarterly Study/monitoring was undertaken in Kunhar River (Up & down stream of Project site) during the month of March 2016. Samplings were carried out at the six study points. Coming studies will give a clear picture of the impact of any construction or change in the water flow on the fish. Some insignificant changes in the fish catch and quality of water observed during the study is only due to the irregular seasonal changes and pattern of water turbidity due intensity of rain or drought. Detailed report is annexed as **Annex-10**.



ii. Flora Study Monitoring:

Quarterly Study/monitoring was undertaken at both (Power house & weir) sites in March 2016. The monitoring report recommends the bio-engineering works for the treatment of unstable slopes and stabilization of landslides to retain the good looks and better environment; detailed report is annexed as **Annex-9**.

Table: Compliance with NEQ's

| Envrn. component | Standards (NEQS) | Compliance/Mitigation measure | Remarks |
|--------------------------------|---|---|---|
| Air Quality | EPA ambient air quality (EPAs standards for each Parameter) | NEQS: To ensure dust suppression due to transportation activity, unpaved roads are being sprinkled with water at least twice a day. The EPC is taking all necessary measures to limit pollution from dust and any wind-blown materials during construction. | Dust control has improved significantly during the quarter. |
| Water quality | WHO Guidelines (EPAs standards for each Parameter) | Waste water from tunnel is treated through sedimentation tanks. Waste water discharged from HRT is being measured | Biannual quality monitoring of waste and drinking water was undertaken in the last quarter of 2015. |
| Noise levels /Vibration | EPA ambient noise standards and worldwide vibration standards. | Noise: Noise prone activities are avoided during night time. No open blasting occurs during quiet hours. Excavators and all heavy machines are lubricated in a routine matter to minimize the noise and to increase the life of equipment Vibration: EPC is more concerned regarding factors of human comfort and structural damage and always try to comply with allowable vibration standards. Blasting checklist is used by HSE staff. | Noise level and vibration record is maintained on daily bases after each blast |
| Soil quality | EPA quality standard (Different standards for each Parameter) | No environmental incident except minor soil contamination has been observed. | Visual observations mitigation was done by removing the contaminated soil cover |
| Flora | Visual observations by relevant Forest professional during EIA study. | Study /monitoring during previous quarter undertaken | Study undertaken in March 2016 (Annex-09) |
| Fish Fauna | Observation by relevant wildlife & Fisheries professional during EIA study. | Study /monitoring for last quarter undertaken | Study undertaken in March 2016 (Annex-10) |

b. Occupational health and safety

Health and safety of workers has been a prime consideration of Project. In accordance with the safety standards all workers working at site are provided with the Personal Protective Equipment (PPE) comprising of hard hats, safety shoes, and jacket and dust masks depending upon the job specification to prevent injuries. Hygienic inspections were conducted by medical staff. Morning physical exercise has also been undertaken regularly. All sub-Contractors have issued necessary PPEs to employees. Also, daily site inspections are undertaken to ensure the implementation. Community Safety Health and Security:

1. Consistent supervision on surge shaft access road and power house protection works was ensured.
2. Waste management training sessions were held for supervisors and relevant personnel. Furthermore, waste segregation methods were practically taught to site workers and staff to adopt appropriate mechanism.
3. Water sprinkling on project access road for workers /community health and safety
4. Water filter plant is installed for drinking water by Daewoo EPCC at camp residence to provide clean & pure water. Filter Plant cartridges are being replaced quarterly to have better quality of water.
5. During quarter, coordination meetings, monitoring and inspections were undertaken jointly by EPCC and OE's HSE staff with regard to site HSE status,. No dumping of excavated material was allowed on unapproved sites.
6. Waste segregation, collection, transportation and disposal mechanism has been improved during the month and full time waste collectors were placed on both sites. Waste management training sessions were held for supervisors and relevant personnel.
7. Sign boards have been made and placed on the site where there is a need to aware people while doing work.
8. It is being ensured that landfill is carried out in such a manner that it does not cause harm to the environment. This can be done by ensuring that landfills are located, designed, constructed, operated and restored so as to ensure that ground and surface waters are not contaminated.

c. CO₂ emissions by the Project

Following project activities are likely to produce CO₂ emissions, which were given due consideration and following mitigating measures were adopted to minimize the CO₂ emissions.

| Sources of CO ₂ | Mitigating/ Preventive Actions |
|--------------------------------|--|
| Use of excavation machinery | Regular tuning/servicing of the machinery is made compulsory and regular inspection is done to ensure that. Smoke producing vehicles are banned from working right away until they are repaired. |
| Tree removal/Land use change | Removal of trees on construction sites will increase the concentration of CO ₂ the Project Site atmosphere as trees acted as CO ₂ sink. Therefore, as corrective approach, Tree Plantation shall be carried out as retrofitting measure as stipulated in the EMP when it will be practically possible. |
| Solid Waste Disposal | Improper waste management could result accumulation of CO ₂ and CH ₄ in the atmosphere. For temporary storage of waste proper waste collection and storage areas have been designated. During last month of the reporting quarter waste management mechanism was improved. |
| Use of Construction machinery | Regular inspections of machinery are practiced by HSE staff to check machinery conditions. Warning letters have been issued by OE and EPCC to the smoke producing and vehicles. |
| Usage of liquid fuel | Liquid fuel used at different project activities amounts the maximum CO ₂ emissions by the project. |
| Emissions from electricity use | Electrical appliances release some trace amount of gases in order to mitigate that, it is in company's policy to switch off all the electrical appliances when not in use. |

d. Environmental and Social Management Plan, including IFC E&HS Action Plan

To manage the environmental and social issue appropriately, following detailed plans developed by EPCC have been in implementation to fulfill the environmental and social compliance requirements of the project;

- a) Plan for Disposal of Excavated Material
- b) Plan for Waste Management
- c) Plan for Traffic Management
- d) Social Uplift Plan

a) Plan for Disposal of Excavated Material

Excavated material is being disposed-off in excavated waste disposal area approved as per EIA. Reconstruction of damaged structures has now been completed during the reporting quarter.

b) Plan for Waste Management

Waste segregation and collection system has considerably been improved on both the sites. EPC and sub-contractors have waste collectors placed on both sites to maintain housekeeping and timely segregation /collection of waste. It is being ensured that landfill is carried out in such a manner that it does not cause harm to the environment. For instance a geo-membrane, concrete and clay lined This can be done by ensuring that landfills are located, designed, constructed, operated and restored so as to ensure that ground and surface waters are not contaminated.



All waste generated in all operation at sites is being managed in accordance with EMP & Waste Management Plan. All the recyclable Waste has been carried and transferred to the scrap dealer.



Paper, Plastics, cardboard and few iron bars have been properly measured by the scrap dealer, the quantity of which has been noted down on the waste consignment note. Daily environmental Performance regarding potential environmental impacts has been made and monitored at site regularly by direct observation and inspection. These impacts include the monitoring of air emissions, water consumption and discharge, waste management, housekeeping, noise impact, hazardous waste management at the project site. Comments have been noted down In case of any improvement or any corrective action regarding any environmental activity if required.

Municipal Corporation Muzaffarabad is being paid to collect the community waste from collection point established near project site where as for project waste a detailed method statement has been prepared and is being implemented on both sites.



First step that has been followed so far in managing our Project waste was the collection of all waste from all points of the site. Then, all the waste from different points are transported to the disposal area and placed in the trench. Next step of segregation has been attempted, in which cardboard, plastic bottles, paper and plastic sheet has been segregated. Then, waste has been transported to Scrap Yard where signature for evidence from waste collector, waste handler/transporter and scrap dealer has been taken on the "Waste Consignment Note" of Waste Management Plan. Thus, most of the Project Waste has been reused and recycled by

selling it to the scrap dealer. Some of the items were of “Reusable” that are used again by a different user or for a different purpose, like a jacket, shoes or a jar used for a cup. They are not reprocessed into raw materials. Whereas some of our Project Waste includes “Recyclables” that are materials like glass, metal and paper that are collected, separated, processed back into raw materials, and made into new products. Final step of Waste Compaction other than segregated waste has been done which is the process of compacting waste, reducing it in size. Wheel loader has been used for compressing waste so that more of it can be stored in the same space. Excavator has also been used to spread the waste evenly in layers over the landfill, and to compact waste to reduce its volume and help to stabilize the landfill.

c) Plan for Traffic Management:

A revised traffic management plan was prepared during last quarter for both sites that partially has been implemented. Parking areas have been designated and speed limit is controlled; safety precautions have been placed to protect workers and the general public. Vehicles are equipped with directional control signage and are being inspected prior to use. Workers have been made aware of mobile equipment operating in the area. Hazard lights have been installed on heavy vehicles and mobile equipment.

d) Social uplift plan:

Revised social uplift plan (SUP) was submitted by EPCC to SHPL in October, 2015. Besides SUP various activities have also been undertaken to facilitate locals such as subletting works, supply of construction material. Status of SUP has been given in (**Annex-11**).

j. Resettlement Plan Implementation

i. Scope of Land Acquisition and Resettlement Impacts

The land identified by the EPC Contractor on the basis of basic design of the Project measuring 872.65 Kanal (683.95 Kanal on AJK and 188.7 Kanal on KP side) was acquired by the Company through Land Acquisition Act (LAA), 1894 applicable in both AJ&K and KPK.

During the construction on the weir site, it was noticed that the land area of 3.7 Kanal “Additional Land” is further required on AJ&K side which is to be submerged due to the head pond of the Project. Due to this addition the total land for the Project becomes 876.35 Kanal.

Furthermore, lately on the complaint of the local Mr. Khalid who also raised the same issue during the Lenders’ E&S mission in November 2015, on the head pond area a survey was

conducted to confirm whether his land is affected or otherwise. EPCC conducted the survey and it was confirmed that his land measuring 7.87 Kanal was being affected due to submergence in the head pond. The process of acquisition has been started by contacting the relevant revenue department.

SUMMARY OF THE LAND TO BE ACQUIRED ON AJK AND KPK

| PERMANENT LAND | | | | | | |
|---|---|-------------------------------|---------------|--------------|--------------|---------------|
| Sr. | Project Component | Affected Land (Kanal) | | | | |
| | | State owned Land/ Riverbed | Farmland | Wasteland | House land | Total |
| 1 | Reservoir Impounding | 87.3 | 282.05 | 231.9 | 9.1 | 610.35 |
| 2 | Weir Structures | 0 | 1.5 | 48.7 | 0 | 50.2 |
| 3 | Powerhouse | 13.6 | 30.1 | 32.85 | 5.25 | 81.8 |
| 4 | Surge Tank | - | - | 47.75 | - | 47.75 |
| 5 | Additional Land | 0.3 | | 3.4 | | 3.7 |
| Total Permanent Land Acquisition (Kanal) | | 101.2 | 313.65 | 364.6 | 14.35 | 793.8 |
| TEMPORARY LAND | | | | | | |
| 1 | Colony of Expatriate construction staff, Switchyard, labor camp, access road, bridge, batching plant at Powerhouse Site | 54.75 | 0 | 27.8 | 0 | 82.55 |
| Total Temporary Land Acquisition (Kanal) | | 54.75 | 0 | 27.8 | 0 | 82.55 |
| Total Land Acquisition (Kanal) | | 155.95 | 313.65 | 392.4 | 14.35 | 876.35 |

ii. Status of Land Acquisition, Progress on Compensation Payments and Assistance Delivery

Payment for land acquisition on both sides of the project is in process. The Company has deposited the assessed cost (100%) into Government treasuries for subsequent payment to APs. For the additional land acquired for the head pond about 92% payment has been made which is reflected in the below table. However there is delay in the payment of compensation due to (i) unavailability of entitled land owners who are working or based in other cities or (ii) an existing shareholding dispute among the families. Status of the land acquisition is as follows;

Summary of Land Acquisition Progress and compensation payments

| Village | Area | Award Amount | Disbursed | %age | No. of Persons | Persons received payment |
|---|--------------|--------------------|--------------------|---------------|------------------|--------------------------|
| 1. AJ&K | | | | | | |
| A. Land/Property | | | | | | |
| Powerhouse (Alda Village AJ&K) | 81.8 | 92,479,824 | 79,320,704 | 85.77% | 196 | 479* |
| Head pond (Shoran Village AJ&K) | 130.75 | 75,181,250 | 73,283,741 | 97.48% | 611 ¹ | 200 |
| Weir + Head pond (Patrind Village AJ&K) | 341.1 | 204,037,798 | 163,691,288 | 80.23% | | 345 |
| Forest land for Surge Tank (Alda village) | 47.75 | | | | | |
| B. Additional Land/Property | | | | | | |
| Weir + Head pond (Patrind Village AJ&K) | 3.7 | 2,127,500 | 1,955,000 | 91.89% | 3 | 3 |
| B. Trees | | | | | | |
| Alda | | 1,815,089 | 1,804,318 | 99.41% | | 19 |
| Alda | | 75,546 | 75,546 | 100.00% | | |
| Shoran | | 757,391 | 685,073 | 90.45% | | 55 |
| Shoran | | 106,053 | 106,053 | 100.00% | 1 | 1 |
| Patrind | | 837,882 | 620,097 | 74.01% | | 33 |
| Sub-Total | 605.1 | 377,418,333 | 321,541,820 | 85.20% | 811 | 1135 |
| 2. KPK | | | | | | |
| Land/Property/Trees | | | | | | |
| Weir + Head pond (Sarati Village KPK) | 188.7 | 128,557,081 | 114,613,320 | 89.15% | 196 | Detail Yet to receive |
| Sub-Total | 188.7 | 128,557,081 | 114,613,320 | 89.15% | 196 | |

*The number of persons who received the payment is higher than the number of affected persons is due to the repetition of the owners names in the payment vouchers¹

k. Resettlement and Reconstruction

Living standards have been improved due to better compensation received and economic activities in the project vicinity. PAPs who lost their houses had utilized compensation amount in reconstruction of houses. Others have made investment in alternative lands in urban areas for better facilities.

Furthermore, locals from adjacent villages have established small businesses like shops and canteens.

l. Resettlement Related Consultation and Disclosure Activities and Grievance

Procedures

In order to ensure that grievances and complaints are addressed in a timely and satisfactory manner and that all possible avenues are available to project affected persons (PAPs) to resolve their grievances, a Grievance Redress Committee has been proposed with following composition:

- | | |
|--------------------------------------|------------------|
| 1. District Revenue Officer | Chairman |
| 2. Union Council Nazim | Principal Member |
| 3. SHPL Representative | Member |
| 4. Affected Community Representative | Member |

Establishment of a grievance committee requires the consent from District Administrations (AJK & KPK). The proposed GRC has not been established because SHPL could not ensure the availability of District Revenue Officers as and when required. Nevertheless, while the GRC has not yet been formalized, issues related with acquisition and compensation and community complaints are being addressed with the involvement of same authorities. In practice the same forum is functional but officially has not yet been notified.

Furthermore, the lenders' E&S mission during their site visit in August 2015 suggested establishing a three tier GRC including the sub-contractors, EPC and SHPL/OE. The same was established and communicated to all the workers and the community for future matters and contact.

GRC would be a forum for raising objections and holding discussions to resolve conflicts. Moreover, consultation with the local community and concerned public representatives and officials of the relevant line departments is an ongoing process. Relevant information to the stakeholders has been provided in a timely manner and in a form and language that are understandable and accessible to them. A grievance mechanism is available to allow an AP appealing any disagreeable decision, practice or activity arising from land or other assets compensation. The community/ APs complaints

are being addressed very diligently and carefully at all levels, i.e. district and at project level. Even though the GRC has yet not been established but complaints received are being addressed at all levels (project & local administration level) depending on nature of complaints. Issues related to land acquisition and compensation requires involvement of District Revenue Officer who is part of proposed GRC while other matters related with employment or employees are being managed through community liaison officers/coordinators and project management.

Annexures

Annex-1

Inspections

Environmental & Social Monitoring Report (Jan-Mar 2016)

| Sr. | Inspection | Date | | | Location | Details |
|-----|-------------------------------|------|-------|------|------------------|--------------|
| | | Day | Month | Year | | |
| 1 | Fire Extinguishers Inspection | 04 | 01 | 2016 | Power House Site | Satisfactory |
| 2 | Color Coding | 16 | 01 | 2016 | Power House Site | Satisfactory |
| 3 | Batching Plant Inspection | 17 | 01 | 2016 | Power House Site | Satisfactory |
| 4 | Heavy Machine/equipment | 27 | 01 | 2016 | Power House Site | Satisfactory |
| 5 | Fire Extinguishers Inspection | 01 | 01 | 2016 | Weir Site | Satisfactory |
| 6 | Fire Extinguishers Inspection | 02 | 01 | 2016 | Weir Site | Satisfactory |
| 7 | Fire Extinguishers Inspection | 03 | 01 | 2016 | Weir Site | Satisfactory |
| 8 | Noise & Vibration | 03 | 01 | 2016 | Weir Site | Satisfactory |
| 9 | Fire extinguishers Inspection | 04 | 01 | 2016 | Weir Site | Satisfactory |
| 10 | Fire extinguishers Inspection | 05 | 01 | 2016 | Weir Site | Satisfactory |
| 11 | Heavy Machine/equipment | 06 | 01 | 2016 | Weir Site | Satisfactory |
| 12 | Heavy Machine/equipment | 07 | 01 | 2016 | Weir Site | Satisfactory |
| 13 | Color Coding | 10 | 01 | 2016 | Weir Site | Satisfactory |
| 14 | Heavy Machine/equipment | 11 | 01 | 2016 | Weir Site | Satisfactory |
| 15 | Heavy Machine/equipment | 13 | 01 | 2016 | Weir Site | Satisfactory |
| 16 | Electric Panels Inspection | 16 | 01 | 2016 | Weir Site | Satisfactory |
| 17 | Power Generator Inspection | 17 | 01 | 2016 | Weir Site | Satisfactory |
| 18 | Heavy Machine/equipment | 18 | 01 | 2016 | Weir Site | Satisfactory |

Environmental & Social Monitoring Report (Jan-Mar 2016)

| Sr. | Inspection | Date | | | Location | Details |
|-----|--|------|-------|------|------------------|---|
| | | Day | Month | Year | | |
| 19 | Heavy Machine/equipment | 19 | 01 | 2016 | Weir Site | Satisfactory |
| 20 | Camp Inspection | 23 | 01 | 2016 | Weir Site | Satisfactory |
| 21 | Mess Inspection | 23 | 01 | 2016 | Weir Site | Satisfactory |
| 22 | Heavy Machine/equipment | 24 | 01 | 2016 | Weir Site | Satisfactory |
| 23 | Heavy Machine/equipment | 25 | 01 | 2016 | Weir Site | Satisfactory |
| 24 | Scaffolding Inspection | 28 | 01 | 2016 | Weir Site | Satisfactory |
| 25 | Environmental Inspection | 31 | 01 | 2016 | Weir Site | Satisfactory |
| 26 | Light Vehicle Inspection and Certification | 12 | 02 | 2016 | Power House Site | Inspection of all light vehicles on lower site carried out by HSE department in collaboration with Mechanical department. |
| 27 | Fire Extinguishers Inspection | 09 | 02 | 2016 | Power House Site | Inspection of fire extinguishers held at Powerhouse site |
| 28 | Heavy Machine/equipment | 16 | 02 | 2016 | Power House Site | Inspection of the heavy equipment's being used on powerhouse site has been carried out by HSE Staff Lower site, |
| 29 | Heavy Machine/equipment | 02 | 02 | 2016 | Weir Site | Satisfactory |
| 30 | Fire Extinguishers Inspection | 02 | 02 | 2016 | Weir Site | Inspection of fire extinguishers held at Weir Site |
| 31 | LTV Vehicle Inspection | 06 | 02 | 2016 | Weir Site | Satisfactory |
| 32 | Heavy Machine/equipment | 08 | 02 | 2016 | Weir Site | Satisfactory |
| 33 | Fire Extinguishers Inspection | 09 | 02 | 2016 | Weir Site | Inspection of fire extinguishers held at Weir Site |
| 34 | LTV Vehicle Inspection | 10 | 02 | 2016 | Weir Site | Satisfactory |

Environmental & Social Monitoring Report (Jan-Mar 2016)

| Sr. | Inspection | Date | | | Location | Details |
|-----|--|------|-------|------|------------------|---|
| | | Day | Month | Year | | |
| 35 | Road Inspection | 11 | 02 | 2016 | Weir Site | Satisfactory |
| 36 | Heavy Machine/equipment | 16 | 02 | 2016 | Weir Site | Satisfactory |
| 37 | Fire Extinguishers Inspection | 17 | 02 | 2016 | Weir Site | Inspection of fire extinguishers held at Weir Site |
| 38 | Camp Inspection | 19 | 02 | 2016 | Weir Site | Satisfactory |
| 39 | Ladder Inspection | 21 | 02 | 2016 | Weir Site | Satisfactory |
| 40 | Crane Inspection | 23 | 02 | 2016 | Weir Site | Satisfactory |
| 41 | Ladder Inspection | 24 | 02 | 2016 | Weir Site | Satisfactory |
| 42 | Hygiene Inspection | 24 | 02 | 2016 | Weir Site | Satisfactory |
| 43 | Fire Extinguishers Inspection | 02 | 03 | 2016 | Power House Site | Inspection of fire extinguishers held at Powerhouse site. |
| 44 | Light Vehicle Inspection and Certification | 08 | 03 | 2016 | Power House Site | Inspection of all light vehicles on lower site carried out by HSE department in collaboration with Mechanical department. |
| 45 | Heavy Machine/equipment | 16 | 03 | 2016 | Power House Site | Inspection of the heavy equipment's being used on powerhouse site has been carried out by HSE Staff Lower site, |
| 46 | Heavy Machine/equipment | 28 | 03 | 2016 | Power House Site | Satisfactory |
| 47 | LTV Vehicle Inspection | 29 | 03 | 2016 | Power House Site | Satisfactory |
| 48 | Fire Extinguishers Inspection | 01 | 03 | 2016 | Weir Site | Inspection of fire extinguishers held at Weir Site |
| 49 | Heavy Machine/equipment | 03 | 03 | 2016 | Weir Site | Satisfactory |
| 50 | Electric Panel Inspection | 05 | 03 | 2016 | Weir Site | Satisfactory |

Environmental & Social Monitoring Report (Jan-Mar 2016)

| Sr. | Inspection | Date | | | Location | Details |
|-----|----------------------------|------|-------|------|-----------|--------------------------------------|
| | | Day | Month | Year | | |
| 51 | Ladder Inspection | 06 | 03 | 2016 | Weir Site | Satisfactory |
| 52 | Heavy Machine/equipment | 07 | 03 | 2016 | Weir Site | Satisfactory |
| 53 | Heavy Machine/equipment | 08 | 03 | 2016 | Weir Site | Satisfactory |
| 54 | Hygiene Inspection | 11 | 03 | 2016 | Weir Site | Hygiene Inspection held at Weir Site |
| 55 | Power Equipment Inspection | 16 | 03 | 2016 | Weir Site | Satisfactory |
| 56 | Generators Inspection | 18 | 03 | 2016 | Weir Site | Satisfactory |
| 57 | Environmental Inspection | 20 | 03 | 2016 | Weir Site | Satisfactory |
| 58 | Ladder Inspection | 21 | 03 | 2016 | Weir Site | Satisfactory |
| 59 | Hygiene Inspection | 24 | 03 | 2016 | Weir Site | Satisfactory |

Annex-2

Work Permit

It's Possible
DAEWOO E&C

PAKISTAN PATRIND HYDRO POWER PROJECT

CONFINED SPACE

PERMIT TO WORK NO. _____

Issue Date: 21/01/2016 Time: 07:00
Validity Date: 21/01/2016 Time: 14:00

WORK DETAIL: CONE DRAFT TUBE FABRICATION
SPECIAL TOOLS TO BE USED: WELDING MACHINE ACCESSORIES
LOCATION: POWER HOUSE

IS ANY OTHER WORK CURRENTLY BEING UNDERTAKEN THAT MAY INTERACT OR AFFECT THIS PERMIT (QUOTE PERMIT NUMBERS WHERE APPLICABLE) _____

Do not proceed with your work until your permit has been authorised by the relevant member of staff.

HAZARDS AND PRECAUTIONS TO BE TAKEN

Primary Hazards: fumes, electric, gases, liquids, sludge, radiation, moving parts, high pressure, etc.

| PLEASE ANSWER THE FOLLOWING QUESTIONS TRUTHFULLY | YES | NO |
|--|-----|----|
| Are you qualified / trained to undertake this work? | ✓ | |
| Has the confined space been isolated from all connected pipework? | N/A | |
| Has the confined space been purged with steam / water / air? | N/A | |
| Has the confined space been electrically isolated and locked out? | N/A | |
| Is the confined space below 30 Degree C on full cooling? | ✓ | |
| Has the reactor been steamed through to recovery for at least 15 mins? | ✓ | |
| Is a supply of respirable air assured / ventilation required? | ✓ | |
| Is there an acceptable means of access to and escape from the confined space? | ✓ | |
| Is breathing apparatus at hand and in good working order? | ✓ | |
| Is a safety line / tripod / harness and any other back-up equipment to hand? | ✓ | |
| Are there adequate emergency arrangements in place? | ✓ | |
| Are you likely to come into contact with asbestos? If yes, please refer to asbestos Present Permit to Work | N/A | |

| TIME OF TEST 1 | | RESULT | TIME OF TEST 2 | | RESULT |
|-------------------------|---|-------------|-------------------------|---|-------------|
| OXYGEN | % | PASS / FAIL | OXYGEN | % | PASS / FAIL |
| HYDROGEN SULFIDE | % | PASS / FAIL | HYDROGEN SULFIDE | % | PASS / FAIL |
| CARBON MONOXIDE | % | PASS / FAIL | CARBON MONOXIDE | % | PASS / FAIL |
| NITROGEN | % | PASS / FAIL | NITROGEN | % | PASS / FAIL |
| COMBUSTIBLE GASES (LEL) | % | PASS / FAIL | COMBUSTIBLE GASES (LEL) | % | PASS / FAIL |

Other Precaution Required: _____

Other Safety Equipment Required: FULL PPE'S

AUTHORISATION AND ACCEPTANCE

I confirm that I have verified the above information and ensured that the necessary precautions have been taken. It is safe to carry out the work as defined above and the permit information has been explained to all workers involved. I accept responsibility for this work.

| | | | |
|--|--------------|-----------|--------------|
| Permit Requester name | Zhan Junming | Signature | Zhan Junming |
| Issuing Authorising Construction Manager | KEM JUNG | Signature | |
| HSE Representative name | ASIF RIAZ | Signature | |

COMPLETION / CANCELLATION

| | | | |
|--|----------|-----------|--|
| Permit Requester name | M. Abbas | Signature | |
| Issuing Authorising Construction Manager | KEM JUNG | Signature | |
| HSE Representative name | Babar | Signature | |

THIS PERMIT IS ONLY VALID WHEN ALL SECTIONS ARE COMPLETE.

| PAKISTAN PATRIND HYDRO POWER PROJECT | | It's Possible DAEWOO E&C | |
|--|-----------------------------|--|------------------|
| Lifting Work | | PERMIT TO WORK NO. | |
| Issue Date | 28-03-2016 | Time | 07:00AM |
| Validity Date | 28-03-2016 | Time | 17:30PM |
| Crane Type | CRANTRY CRANE | Type of the Load to be lifted | PIPES + MATERIAL |
| No. of Workers | 4 | Maximum Weight of Load | 18 TON |
| Operator Name | Guo Yaohua | Rigger Name | PANG FU BIN |
| Do not proceed with your work until your permit has been authorised by the relevant member of staff. | | | |
| HAZARDS AND PRECAUTIONS TO BE TAKEN | | | |
| PRIMARY HAZARDS - fumes, electrics, liquids, sludge, moving parts | | | |
| PLEASE ANSWER THE FOLLOWING QUESTIONS TRUTHFULLY | | YES | NO |
| Crane operator holding the valid licence | | ✓ | |
| Crane travel routes determined | | ✓ | |
| crane sitting on firm foundation out rigger pade | | ✓ | |
| Area roped off & signs displayed | | N/A | |
| Over / under ground facilities are be protected | | ✓ | |
| sling wire & lifting equipments are be tested | | ✓ | |
| Other Precaution Required | | | |
| Other Safety Equipment Required | | FULL PPE'S | |
| AUTHORISATION AND ACCEPTANCE | | | |
| I confirm that I have verified the above information and ensured that the necessary precautions have been taken. It is safe to carry out the work as defined above and the permit information has been explained to all workers involved. I accept responsibility for this work. | | | |
| Permit Requester name | Lia QI | Signature | Lia QI |
| Issuing Authorising Construction Manager | HSE MANAGER KIM JUNG MIN | Signature | |
| HSE Representative name | Anees | Signature | Anees |
| COMPLETION OR CANCELLATION | | | |
| I confirm that the work has been completed / partially completed *, checked by my self and the area left in a safe and tidy condition. (*delete as appropriate) | | | |
| Permit Requester name | MUSHTAQ SHEIKH | Signature | Mushtaq |
| Issuing Authorising Construction Manager | HSE MANAGER KIM JUNG MIN | Signature | |
| HSE Representative name | Babbar | Signature | |
| THIS PERMIT IS ONLY VAILD WHEN ALL SECTIONS ARE COMPELTE. | | | |

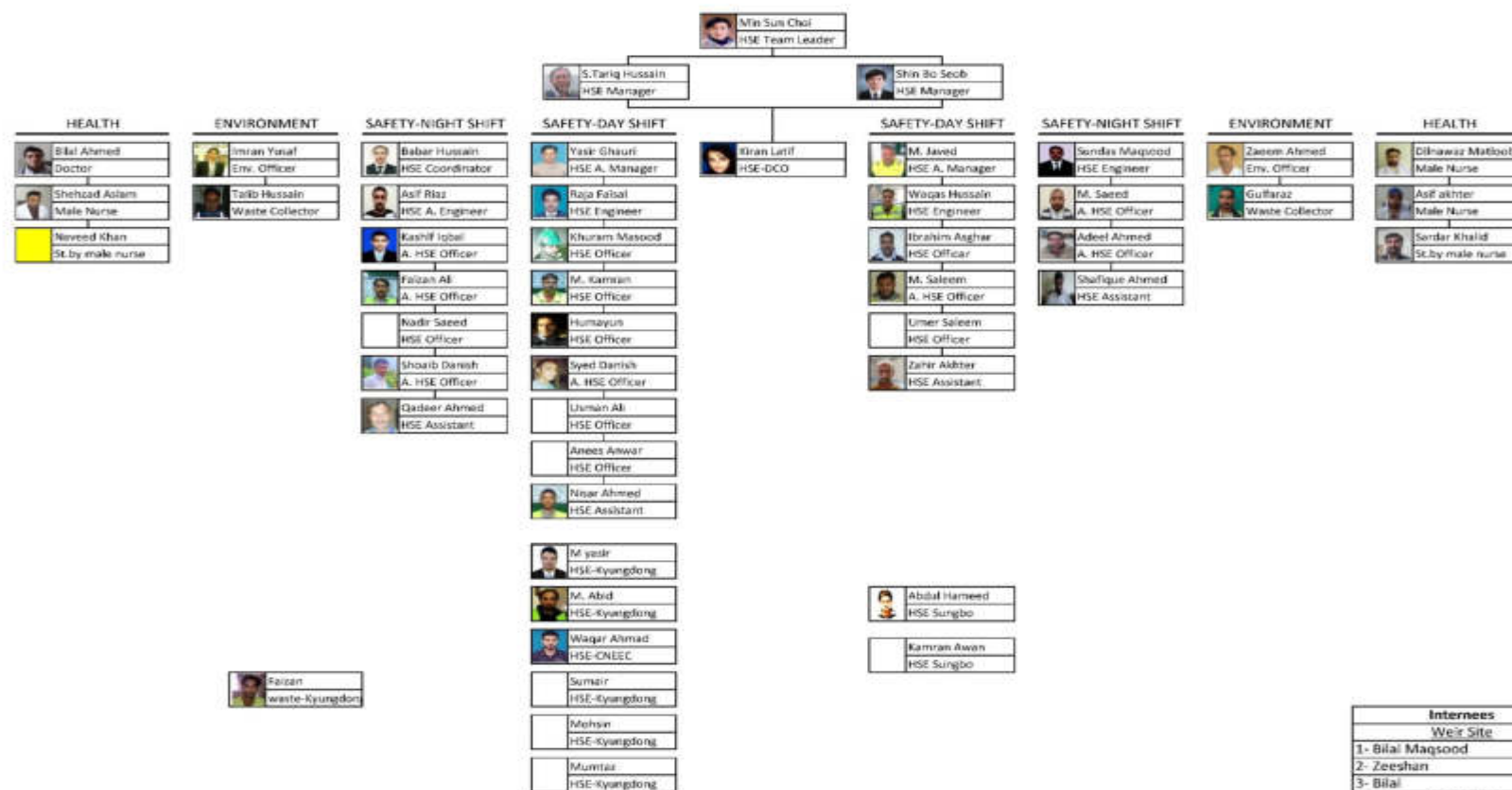
| PAKISTAN PATRIND HYDRO POWER PROJECT | | DAEWOO E&S | |
|--|---|--------------------|----------------|
| CUTTING / WELDING / HOT WORK PERMIT | | PERMIT TO WORK NO. | |
| WORK DETAIL | PEN STOCK PIPES INSTALATION + FABRICATION | | |
| SPECIAL TOOLS TO BE USED | WELDING MACHINE + ACCESORIES | | |
| LOCATION | PEN STOCK TUNNEL, POWER HOUSE | | |
| Issue Date | 28-03-2016 | Time | 07:00 AM |
| Validity Date | 28-03-2016 | Time | 17:30 PM |
| Do not proceed with your work until your permit has been authorised by the relevant member of staff. | | | |
| HAZARDS AND PRECAUTIONS TO BE TAKEN | | | |
| PRIMARY HAZARDS: Fumes, Sparks, Hot Surfaces, Slips, Trips, Falls | | | |
| PLEASE ANSWER THE FOLLOWING QUESTIONS TRUTHFULLY | | YES | NO |
| Building sprinklers or other fire suppression systems. | | | ✓ |
| cutting welding, flame or spark producing equipment is in good. | | ✓ | |
| Isolation of Plant. | | | ✓ |
| Operator having good visibility. | | ✓ | |
| All flammable and combustible material have been removed. | | ✓ | |
| Warning signs attached. | | ✓ | |
| All sources of flammable vapors or combustible dusts have been eliminated. | | ✓ | |
| Leaking checks of all the units. | | ✓ | |
| Booths have been covered. | | ✓ | |
| All equipment has been cleaned. | | ✓ | |
| Check fire extinguisher condition and location. | | ✓ | |
| Other Precaution Required | | | |
| Other Safety Equipment Required | | FULL PPE'S | |
| AUTHORISATION AND ACCEPTANCE | | | |
| I confirm that I have verified the above information and ensured that the necessary precautions have been taken. It is safe to carry out the work as defined above and the permit information has been explained to all workers involved. I accept responsibility for this work. | | | |
| Permit Requester | Zhan Junmeng | Signature | Zhan Junmeng |
| Issuing Authorising | MSE MANAGER KIM JUNG MIN | Signature | |
| HSE Representative | KHURAM | Signature | |
| HAND BACK AND CANCELLATION | | | |
| I confirm that the work has been completed / partially completed *, checked y my self and the area left in a safe and tidy condition. (*delete as appropriate) | | | |
| Permit Requester | MUSHTAQ SHEIKH | Signature | Mushtaq Sheikh |
| Issuing Authorising | MSE MANAGER KIM JUNG MIN | Signature | |
| HSE Representative | Babar | Signature | |
| THIS PERMIT IS ONLY VAILD WHEN ALL SECTIONS ARE COMPELTE. | | | |

Annex-3

HSE Organization

Environmental & Social Monitoring Report (Jan-Mar 2016)

HSE ORGANIZATION CHART



DAEWOO SAFETY STAFF = 29
S-CORP SAFETY STAFF = 8
TOTAL SAFETY STAFF = 37

| |
|------------------|
| Internees |
| Weir Site |
| 1- Bilal Maqsood |
| 2- Zeeshan |
| 3- Bilal |
| Internees |
| Powerhouse site |
| 1- Awaiz Abbasi |
| 2- Majid |
| 3- Kamran |

Annex-4

WEEKLY MEETINGS

Environmental & Social Monitoring Report (Jan-Mar 2016)

| Sr. | Meeting | Location | Date | | | Start Time | Main agenda |
|-----|---|---|------|-------|------|------------|--|
| | | | Day | Month | Year | | |
| 1 | Weekly HSE Meeting with Subcontractors and Construction Team Lower Site | HSE Training Hall Camp Office Powerhouse Site | 13 | 01 | 2016 | 14:00 | 1-Tunnel status card procedure is not being followed properly 2- Unsafe conditions on road 3-Unsafe conditions regarding work at heights and scaffolding 4-Housekeeping issues 5-Lifting safety 6-Electric unsafe conditions from Kyungdong 7- Fire safety/ wrong storage of gas cylinders 8-No PPEs during welding cutting and hot work by CNEEC workers. |
| 2 | Weekly HSE Meeting with Subcontractors and Construction Power House Site. | HSE Training Hall Camp Office Powerhouse Site | 20 | 01 | 2016 | 10:00 | 1-Electrical cables beneath the iron bars 2-Electrical DB on ground 3-Ladder found without hand railing 4-Maintenance of Excavators and other heavy vehicles being carried out on site 5-Work at height without body harness 6-Labor inside tunnel without PPEs 7-Unsafe working platforms 8-Damaged sling was used during lifting 9-Welding work carried out without PPEs 10-Sedimentation tanks not being cleaned properly. |
| 3 | Weekly HSE Meeting with Subcontractors and Construction Team Lower Site | HSE Training Hall Camp Office Powerhouse Site | 13 | 02 | 2016 | 14:00 | 1- work at height issues 2- Scaffolding Safety (missing steel plates) 3- Gas cylinder storage without MSDS 4- 4- Sling used for Muck basket and man basket is without any TPI 5- Generator without grounding 6- Welding and cutting work without apron. |

Environmental & Social Monitoring Report (Jan-Mar 2016)

| | | | | | | | |
|---|---|---|----|----|------|-------|---|
| 4 | Weekly HSE Meeting with Subcontractors and Construction Power House Site. | HSE Training Hall Camp Office Powerhouse Site | 24 | 02 | 2016 | 14:30 | <ul style="list-style-type: none"> 1- Work at height 2- Confined space entry (status board removed from penstock) 3- Scaffolding safety (working without handrails) 4- Poor management of electrical cables 4- Work at height (Using single lanyards at powerhouse area) 5- High pressure pipes found without whips. 6- No flashback arrestors with the gas cylinders in powerhouse area 7- Fire safety (cylinders on site without cage) |
| 5 | Weekly HSE Meeting with Subcontractors and Construction Team Lower Site | HSE Training Hall Camp Office Powerhouse Site | 02 | 03 | 2016 | 14:00 | <ul style="list-style-type: none"> 1- vehicle maintenance at site 2-Oil Spillage 3-Some drivers found without license 4-Access and material dumping 5-Dumping of waste beside the HRT store 6-No proper chemical storage 7-working without platform 8- Damaged cables are being used at site 9-unmanaged electrical cables at penstock. |
| 6 | Weekly HSE Meeting with Subcontractors and Construction Power House Site. | HSE Training Hall Camp Office Powerhouse Site | 16 | 03 | 2016 | 14:30 | <ul style="list-style-type: none"> 1-Housekeeping issue from Kyungdong 2- no proper storage for oil 3-work at height issues from Kyungdong 4-No wooden pads for outriggers of pump car at p/h site 5-Housekeeping issue in penstock tunnel 6-unsafe welding works & improper storage of gas cylinders & electrical DB issues(CNEEC) 7-use of damaged trolley by Daewoo E&C 2 workers. |

Environmental & Social Monitoring Report (Jan-Mar 2016)

| | | | | | | | |
|---|--|---|----|----|------|-------|---|
| 7 | Weekly HSE Meeting with Subcontractors and Construction Weir Site. | HSE Training Hall Camp Office Weir Site | 14 | 03 | 2016 | 14:00 | Discussed all HSE matters with construction team. |
| 8 | Weekly HSE Meeting with Subcontractors and Construction Weir Site. | HSE Training Hall Camp Office Weir Site | 30 | 03 | 2016 | 14:00 | Discussed all HSE matters with construction team. |

Annex-5

HSE TRAININGS

Environmental & Social Monitoring Report (Jan-Mar 2016)

| Sr. No | Title of the training | Date | | | Trainer | Time | Site | Location | No. of attendees | Contractor |
|--------|---------------------------|------|-------|------|-----------|-------|-----------|-------------------|------------------|--------------------------|
| | | Day | Month | Year | | | | | | |
| 1 | Lifting Safety | 03 | 01 | 2016 | M. Javeed | 11:00 | Weir Site | HSE Training Hall | 20 | Sung Bo |
| 2 | Hot Work Safety Training | 10 | 01 | 2016 | M. Javeed | 11:00 | Weir Site | HSE Training Hall | 28 | Sung Bo , Kyung Dong E&C |
| 3 | Scaffolding Safety | 11 | 01 | 2016 | M. Javeed | 11:00 | Weir Site | HSE Training Hall | 23 | Kyung Dong E&C |
| 4 | Hot Work Safety Training | 12 | 01 | 2016 | M. Javeed | 11:00 | Weir Site | HSE Training Hall | 20 | Sung Bo |
| 5 | Hot Work Safety Training | 13 | 01 | 2016 | M. Javeed | 11:00 | Weir Site | HSE Training Hall | 9 | Sung Bo |
| 6 | Hot Work Safety Training | 14 | 01 | 2016 | M. Javeed | 11:00 | Weir Site | HSE Training Hall | 12 | HES PAK |
| 7 | Hot Work Safety Training | 15 | 01 | 2016 | M. Javeed | 11:00 | Weir Site | HSE Training Hall | 20 | Sung Bo |
| 8 | Welding Safety | 17 | 01 | 2016 | M. Javeed | 11:00 | Weir Site | HSE Training Hall | 10 | Kyung Dong E&C |
| 9 | Lifting Safety | 19 | 01 | 2016 | M. Javeed | 11:00 | Weir Site | HSE Training Hall | 10 | Sung Bo |
| 10 | Crane Safety | 20 | 01 | 2016 | M. Javeed | 11:00 | Weir Site | HSE Training Hall | 14 | Sung Bo |
| 11 | Lifting Safety | 22 | 01 | 2016 | M. Javeed | 07:30 | Weir Site | HSE Training Hall | 10 | HES PAK |
| 12 | Lifting Safety | 22 | 01 | 2016 | M. Javeed | 11:00 | Weir Site | HSE Training Hall | 9 | Sung Bo |
| 13 | Signalman Training | 24 | 01 | 2016 | M. Javeed | 11:00 | Weir Site | HSE Training Hall | 12 | HES PAK/ Sung Bo |
| 14 | Crane Safety | 28 | 01 | 2016 | M. Javeed | 11:00 | Weir Site | HSE Training Hall | 12 | Sung Bo |
| 15 | Lifting Safety/ Induction | 29 | 01 | 2016 | M. Javeed | 05:00 | Weir Site | HSE Training Hall | 80 | Sung Bo |

Environmental & Social Monitoring Report (Jan-Mar 2016)

| Sr. No | Title of the training | Date | | | Trainer | Time | Site | Location | No. of attendees | Contractor |
|--------|-----------------------------|------|-------|------|----------------|-------|-----------------|----------------------------------|------------------|-----------------------------------|
| | | Day | Month | Year | | | | | | |
| 16 | Crane Safety | 20 | 01 | 2016 | Syed Tariq | 11:00 | Powerhouse Site | HSE Training Hall Camp Office | 19 | CNEEC |
| 17 | Crane Safety | 22 | 01 | 2016 | Syed Tariq | 07:00 | Powerhouse Site | HSE Training Hall Camp Office | 13 | Daewoo E & C, KyungDong E & C |
| 18 | Manbasket Safety Training | 26 | 01 | 2016 | Syed Tariq | 11:00 | Powerhouse Site | HSE Training Hall Camp Office | 08 | HES PAK |
| 19 | Manbasket Safety Training | 28 | 01 | 2016 | Syed Tariq | 11:00 | Powerhouse Site | HSE Training Hall Camp Office | 04 | Daewoo E & C |
| 20 | Manbasket Safety Training | 29 | 01 | 2016 | Syed Tariq | 11:00 | Powerhouse Site | HSE Training Hall Camp Office | 20 | KyungDong E & C |
| 21 | General Safety Training | 06 | 02 | 2016 | Syed Tariq | 15:00 | Powerhouse Site | HSE Training Hall Camp Office | 25 | Daewoo E & C |
| 22 | General Safety Training | 06 | 02 | 2016 | Syed Tariq | 07:00 | Powerhouse Site | HSE Training Hall Camp Office | 48 | Daewoo E & C |
| 23 | Scaffolding Safety Training | 09 | 02 | 2016 | Syed Tariq | 11:00 | Powerhouse Site | HSE Training Hall Camp Office | 11 | Daewoo E & C and Sub-Contractors |
| 24 | General Safety Training | 09 | 02 | 2016 | Syed Tariq | 07:00 | Powerhouse Site | HSE Training Hall Camp Office | 14 | Daewoo E & C |
| 25 | Defensive Driving Training | 16 | 02 | 2016 | Syed Tariq | 08:00 | Powerhouse Site | HSE Training Hall Camp Office | 13 | Daewoo E&C and all subcontractors |
| 26 | Scaffolding Safety | 18 | 02 | 2016 | Ibrahim Asghar | 13:30 | Powerhouse Site | HSE Training Hall Camp Office | 14 | Daewoo E & C |

Environmental & Social Monitoring Report (Jan-Mar 2016)

| Sr. No | Title of the training | Date | | | Trainer | Time | Site | Location | No. of attendees | Contractor |
|--------|--|------|-------|------|--------------|-------|-----------------|----------------------------------|------------------|--------------------------------------|
| | | Day | Month | Year | | | | | | |
| 27 | Signalman/ Banks man Training | 24 | 2 | 2016 | Yasir Ghauri | 7:00 | Powerhouse Site | HSE Training Hall Camp Office | 5 | Daewoo E&C and all subcontractors |
| 28 | Working at height | 24 | 2 | 2016 | Syed Tariq | 7:00 | Powerhouse site | HSE Training Hall Camp Office | 79 | Daewoo E&C and Kyungdong |
| 29 | Working at height | 26 | 2 | 2016 | Syed Tariq | 7:00 | Powerhouse site | HSE Training Hall Camp Office | 62 | Daewoo E&C (Arch Team) |
| 30 | Fire Warden Training for Office Boy and junior staff HSE | 19 | 02 | 2016 | Syed Tariq | 10:00 | Powerhouse Site | HSE Training Hall Camp Office | 27 | Daewoo E&C and all subcontractors |
| 31 | Excavation Safety Training | 14 | 02 | 2016 | M Javed | 13:00 | Weir Site | HSE Training Hall | 19 | HES Pak |
| 32 | Driving Safety | 15 | 02 | 2016 | Ibrahim | 05:00 | Weir Site | HSE Training Hall | 12 | Sungbo |
| 33 | Fire Fighting Training | 19 | 02 | 2016 | M Javed | 04:00 | Weir Site | HSE Training Hall | 16 | Daewoo |
| 34 | Work At Height Training | 26 | 02 | 2016 | M Javed | 11:00 | Weir Site | HSE Training Hall | 46 | Sungbo |
| 35 | Confined Space Entry | 05 | 03 | 2016 | Syed Tariq | 7:00 | Powerhouse Site | HSE Training Hall Camp Office | 48 | Daewoo E & C and all Sub Contractors |
| 36 | Chemical Handling Training | 08 | 03 | 2016 | Syed Tariq | 15:00 | Powerhouse Site | HSE Training Hall Camp Office | 09 | Daewoo E & C & Kyungdong |

Environmental & Social Monitoring Report (Jan-Mar 2016)

| Sr. No | Title of the training | Date | | | Trainer | Time | Site | Location | No. of attendees | Contractor |
|--------|---------------------------------|------|-------|------|--------------|-------|-----------------|----------------------------------|------------------|-----------------------------------|
| | | Day | Month | Year | | | | | | |
| 37 | Emergency Evacuation Training | 12 | 03 | 2016 | Yasir Ghauri | 12:30 | Powerhouse Site | HSE Training Hall Camp Office | 08 | Daewoo E & C |
| 38 | Electrical Safety Training | 18 | 03 | 2016 | Syed Tariq | 07:00 | Powerhouse Site | HSE Training Hall Camp Office | 42 | Kyungdong |
| 39 | Work at Height- SIMOPS Training | 24 | 03 | 2016 | Syed Tariq | 7:00 | Powerhouse Site | HSE Training Hall Camp Office | 42 | Daewoo E & C & Kyungdong |
| 40 | Defensive Driving Training | 30 | 03 | 2016 | Syed Tariq | 14:30 | Powerhouse Site | HSE Training Hall Camp Office | 8 | Daewoo E&C and all subcontractors |
| 41 | Scaffolding Safety | 06 | 03 | 2016 | Syed Tariq | 11:00 | Weir Site | On Site | 23 | Sungbo |
| 42 | Working at height | 09 | 03 | 2016 | M. Javeed | 11:00 | Weir Site | HSE Training Hall Camp Office | 63 | Sungbo |
| 43 | Working at height | 19 | 03 | 2016 | M. Javeed | 11:00 | Weir Site | HSE Training Hall Camp Office | 42 | Sungbo |
| 44 | PTW & JSA Training | 27 | 03 | 2016 | M. Javeed | 10:00 | Weir Site | HSE Training Hall Camp Office | 27 | PDL |
| 45 | Excavation Safety Training | 14 | 03 | 2016 | M Javed | 13:00 | Weir Site | HSE Training Hall | 19 | HES Pak |
| 46 | Driving Safety | 15 | 03 | 2016 | Ibrahim | 05:00 | Weir Site | HSE Training Hall | 12 | Sungbo |
| 47 | Fire Fighting Training | 19 | 03 | 2016 | M Javed | 04:00 | Weir Site | HSE Training Hall | 16 | Daewoo |
| 48 | Work At Height Training | 26 | 03 | 2016 | M Javed | 11:00 | Weir Site | HSE Training Hall | 46 | Sungbo |

Annex-6

Monthly HSE Plan

Environmental & Social Monitoring Report (Jan-Mar 2016)



MONTHLY HSE PLAN

(PATRIND HYDRO POWER PROJECT)

| JANUARY 2016 | | | | | | |
|--|---|--|--|---|-----|-----|
| MON | TUE | WED | THU | FRI | SAT | SUN |
| <ul style="list-style-type: none"> As ongoing activity daily Tool Box Meetings will be held on both sites. Site inspection and monitoring of HSE status will be carried out repeatedly on daily basis. Daily & weekly HSE progress reports will be consistent activities. | | | | 1 | 2 | 3 |
| | | | | Heavy Equipment Inspection (Lower Site) + Monthly HSE Report to Head Office | | |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Management HSE Walkthrough (Both sites) + Weekly Progress meeting (All departments) + Weekly HSE Report to Head Office + Internal HSE Meeting + Ambulance Inspection by Medical Attendants (Lower Site) | Weekly HSE Meeting with construction team (Lower Site) + Weekly HSE Report to SHPL/PES + Monthly HSE Report to PES / SHPL | Weekly HSE Meeting with construction team (Upper Site) + PPEs Inspection (Lower Site) + Training Session on work at height (Both Sites) | Batching Plant Inspection (Upper Site) + Electrical Equipment Inspection (Lower Site) + Color Coding Inspection (both sites) | Batching Plant Inspection (Lower Site) + Ambulance Inspection by Medical Attendants (Upper Site) | | |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| Management HSE Walkthrough (Both sites) + Weekly Progress meeting (All departments) + Weekly HSE Report to Head Office + Internal HSE Meeting | Weekly HSE Meeting with construction team (Lower Site) + Weekly HSE Report to SHPL/PES | Weekly HSE Meeting with construction team (Upper Site) + PPEs Inspection (Upper Site) + Lifting Safety Training (Both Sites) | Fire Extinguishers Inspection (Lower site) | Fire Extinguishers Inspection (Upper site) | | |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| Management HSE Walkthrough (Both sites) + Weekly Progress meeting (All departments) + Weekly HSE Report to Head Office + Internal HSE Meeting | Weekly HSE Meeting with construction team (Lower Site) + Weekly HSE Report to SHPL/PES | Weekly HSE Meeting with construction team (Upper Site) + Subcontractor's HSE violation charge Bills submission to planning + Hand and power tools safety Training (Both Sites) | Site Visit by HSE Management for monitoring the labor conditions and site housekeeping (Upper Site) + Subcontractor's PPE Bills submission to Planning | Heavy Equipment Inspection (Upper Site) + Site Visit by HSE Management for monitoring the labor conditions and site housekeeping (Lower Site) | | |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| Management HSE Walkthrough (Both sites) + Weekly Progress meeting (All departments) + Weekly HSE Report to Head Office + Internal HSE Meeting | Weekly HSE Meeting with construction team (Lower Site) + Weekly HSE Report to SHPL/PES | Weekly HSE Meeting with construction team (Upper Site) + Driving safety Training (Both Sites) | Electrical Equipment Inspection (Upper Site) | Inspection of waste management (upper site) | | |

Prepared by:
HSE Manager

M. S. Chow
[Signature]

Approved by
Project Manager

[Signature]

Annex-7

EMP COMPLIANCE STATUS

Environmental & Social Monitoring Report (Jan-Mar 2016)

| Sr. No | Environmental Management Plan (Compliance Status) | | |
|--------|---|---|---|
| | Feature/Issue | Parameters/monitoring | Compliance Status/Action taken by EPCC |
| 1. | Statutory Requirements | Compliance with approval conditions | <ul style="list-style-type: none"> With few exceptions, implementation in compliance with EPA's NOC & ADB's Environmental and Social Safeguards, IFC's Performance Standards |
| 2. | Landslides | Catchment stability | <ul style="list-style-type: none"> Annual Monitoring undertaken after monsoon during September 2015 and report received from experts and has already been shared with SHPL & OE. Slope stability on powerhouse and surge shaft slopes is under process and stone pitching is also under process on the right bank slopes on weir site. |
| 3. | Erosion and Sediment | i. Extent of erosion and sedimentation ii. Topsoil stripped and covered or seeded if stockpiled for longer than one month or during the monsoon | <ul style="list-style-type: none"> Erosion & Sediments on project sites has yet not been quantified, however, to prevent this protection works have been undertaken on slopes at both sites. Wind erosion of dust and sand has been controlled by frequent water sprinkling and covering stockpiles with polythene sheets To prevent HRT waste water sediments flow to the river settling tanks and chambers have already been constructed and are cleaned on regular basis. |
| 4. | Muck Disposal | i. Reuse of spoil/muck within project areas where possible ii. Correct disposal of surplus spoil/muck in designated areas | <ul style="list-style-type: none"> Excavated material being used in civil works and dumping is done on approved area at both sites. Muck material has also been used in repairing of project access road during the month |
| 5. | Water Quality | Wastewater treated prior to river discharge (Temperature, dissolved oxygen, pH, conductivity, turbidity, total phosphorous, inorganic phosphorous, total nitrogen, ammonia nitrogen, nitrogen oxides, biochemical oxygen demand and fecal coli forms) | <ul style="list-style-type: none"> Biannual water quality monitoring will be undertaken during June 2016 and reports have been shared with OE. |
| 6. | Waste Management | i. Waste materials reused or recycled on-site where possible ii. Non-recyclable wastes disposed of appropriately | <ul style="list-style-type: none"> Papers, mineral water bottles are being sent to market for recycling On both sites garbage/Waste is disposed in designated trenches Segregation on source has been improved |

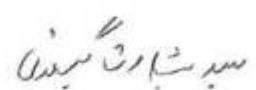
Environmental & Social Monitoring Report (Jan-Mar 2016)

| Sr. No | Environmental Management Plan (Compliance Status) | | |
|--------|---|---|--|
| | Feature/Issue | Parameters/monitoring | Compliance Status/Action taken by EPCC |
| | | | <ul style="list-style-type: none"> Waste consignment note has been maintained by keeping the recyclable waste record properly and remaining food waste has been composted into the designated trench in the disposal area |
| 7. | Hazards/Risk | i. Workers provided with appropriate safety equipment and regular safety training ii. Storage of hazardous goods in bounded areas or in secure sheds iii. Explosives stored in guarded bunkers iv. Use of hazardous goods according to manufacturers' specifications | <ul style="list-style-type: none"> Induction trainings Providing PPEs Tool Box Meetings, Job craft & on site trainings Explosive store established under NOC (Lower Site) MSDS and SOPs partially followed |
| 8. | Aquatic Ecology | i. Fish and Aquatic populations | <ul style="list-style-type: none"> Fish study was undertaken during this quarter. Fishing& hunting prohibited on project sites. No endanger species found. No considerable disturbance to aquatic life |
| 9. | Flora | i. Direct observation of surrounding vegetation | <ul style="list-style-type: none"> Study/monitoring undertaken during quarter. Removal undertaken as indicated in EIA. Mitigation measures will be undertaken after construction phase. Plantation activity undertaken above surge shaft slopes. |
| 10. | Noise and Vibration | i. Maintenance of equipment in accordance with manufactures' specifications ii. Controlled blasting | <ul style="list-style-type: none"> Regular inspections and service of heavy equipment Regular monitoring, blast permit issuance and SOPs adopted |
| 11. | Air Quality | Exhaust emissions from machinery – visual inspection | <ul style="list-style-type: none"> Regular inspections and service of heavy equipment |
| 12. | Traffic/Access | i. Enforcement of speed limits on Project roads ii. Noise Traffic Signs | <ul style="list-style-type: none"> Heavy equipment/vehicle driver's education sessions Speed limit and directional sign board installed |












Annex-8

ENVIRONMENTAL INSPECTION

CHECKLIST

| PROJECT DAEWOO E&C | |
|--|-------------------------------------|
| <u>WASTE TRANSFER NOTE (FOR OFFSITE DISPOSAL ONLY)</u> | |
| PART A | |
| Place : <u>Infront of PES</u> | |
| Description of Waste and Estimate of Quantity (If more than one load state expected number) (1500RS) | |
| <u>Community Waste Infront of PES.</u> | |
| Date Collected : <u>27th January, 2016</u> | Time Collected : <u>10:30 AM</u> |
| DESTINATION : <u>Infront of PES.</u> | |
| Vehicle Reg #/ Identification : <u>MCM DUMPER.</u> | |
| Signed for (officer) : <u>[Signature]</u> | |
| Signed (for DAEWOO officer) : <u>[Signature] 22-1-2016</u> | |
| PART B | |
| <u>DISPOSAL SITE</u> | |
| This is to confirm that the above described waste was received at the destination stated above | |
| Permission has been given to offload | <input checked="" type="checkbox"/> |
| Permission was denied because: (Describe the reasons why it is denied) | <input type="checkbox"/> |
| <div style="text-align: center;">  </div> | |
| Name & Sign. (For Disposal Site), | |
| Date <u>27/01/2016</u> | Time <u>10:30 AM</u> |

Log Sheet for water bowser

| Date | 1 st Time | 2 nd Time | Places | Operator Name | HSE Staff Signature |
|----------------|----------------------|----------------------|--|---------------|---|
| 23rd Feb, 2016 | 10 Am. | 1:30 pm. | Camp office, Bridge, Front of Batching Plant | PERVAIZ |  |
| 24th Feb, 2016 | // | // | Bridge, camp office. Batching plant Front | PERVAIZ. |  |
| 25th Feb, 2016 | 10:30 Am | 2:00 pm | Bridge, Camp office Bypass Road. | Pervaiz |  |
| 26th Feb, 16 | 10:30 Am 11:30 Am | 2:30 pm 4:00 pm | Bridge, Thuri Park. Camp office, | Pervaiz |  |
| 27th Feb, 16 | 11:00 Am | 2:00 pm | Bridge, camp office, Bypass Road. | Pervaiz |  |
| 28th Feb, 16 | 09:00 Am | | Bridge, Camp office, | Pervaiz |  |
| 29th Feb, 16 | 10:00 am. | 2:00 pm. | Bridge, camp office, Bypass. | Pervaiz |  |
| 1st March 2016 | 10:00 Am. | 2:00 pm. 4:00 pm. | Camp office, Bypass road, Bridge area. | Pervaiz |  |
| 2nd March 16. | 10:00 Am | 2:00 pm 4:00 pm | Camp office, Bypass road, Bridge area | Pervaiz |  |
| 3rd March 16 | 11:00 Am. | 2:30 pm 4:30 pm | Bridge Area, Camp office, | Pervaiz |  |
| 4th March 16. | 11:00 Am. | 2:30 pm. 4:30 pm | Camp office, Bridge Area, Bypass Road. | Pervaiz |  |
| — | — | — | — | — | — |

HSE MANAGER.



ENVIRONMENT OFFICER.



Patrind Hydropower Project

2016

WEEKLY ENVIRONMENTAL COMPLIANCE CHECKLIST

| Date Start | Date Finish | Month | Location | Inspected By | Reviewed By | Noted By |
|------------|-------------|---------|------------------|--------------|---------------|--------------|
| 24-01-2016 | 31-01-2016 | January | Power House Site | Imran Yousaf | Kamran Janjua | Min Sun Choi |

| ENVIRONMENTAL ASPECT/IMPACT | Yes | ENVIRONMENTAL ASPECT/IMPACT | Yes |
|---|-----|---|-----|
| 1. Air emissions: Does the project monitor emissions from dust, or chemical gases? | ✓ | 2. Chemical Use, Storage, and Inventory: Does the project manage lab chemicals, fuel, oils, cleaners, or solvents? | ✓ |
| 3. Waste Generation, Management, Storage, Transportation and Disposal: Do any Hazardous/Non-Hazardous waste be generated and managed by the project? | ✓ | 4. Interaction with Wildlife/Habitat: Do the project disturb soil in habitat areas or disrupt bird nests, aquatic life or other wildlife areas? | ✓ |
| 5. Use, Reuse, and Recycling: Are any project activities designed to minimize generation of waste through reuse, recycling, and environmentally preferable purchasing, such as purchasing recycled-content materials? | ✓ | 6. Soil Pollution: Does the project manage chemical spills for preventing soil contamination? | ✓ |
| 7. Noise: Does the project generate and monitor noise that would impact personnel or wildlife nearby? | ✓ | 8. Housekeeping: Do the project conducting good housekeeping practices for the entire site daily? | ✓ |
| 9. Soil and Groundwater Contamination: Do project activities prevent soil and groundwater contamination in any way? | ✓ | 10. Vegetation clearance: Does the project accomplish and supervise any alteration or removal of vegetation in or near surface water? | ✓ |

EXPLAIN THOSE ITEMS IDENTIFIED ABOVE THAT WERE CHECKED, AND DESCRIBE THE CORRESPONDING CONTROLS TO BE IMPLEMENTED TO REDUCE POTENTIAL ENVIRONMENTAL IMPACTS:

It has been observed that there is a lot of paper usage in the office which is definitely effecting our environment so I conducted tool box talk with the officials in the morning exercise and ask them not to misuse the paper and recycle it and circulate your message via email and other media.

Apart from above the generator new powerhouse is producing a lot of smoke. I asked the kyungdong management to maintain that generator or remove it from site in order to protect environment. They have asked me to give them three days for the maintenance if it's not maintained then they going to remove that generator from site.

Signature of Site Officer  Imran Yousaf Date 31-01-2016

Reviewed by HSE Manager  Kamran Janjua Date 31-01-2016

Noted By Team Leader  Min Sun Choi Date 31-01-2016



Weekly waste Disposal manifest

Kyoungdong

| Date (yyyy.mm.dd) | Time (00:00) | Waste Description | Non-Hazardous /Hazardous | Unit | Quantity | Origin of waste | Transport No. | Waste transporter Name and signature | Disposal Location |
|----------------------|-----------------|-------------------------------|------------------------------|------|---------------|---|-------------------|--|--------------------------|
| 15-Feb-2015 | 2:00pm | Food Waste, Residual Waste | Non- Hazardous ✓ | KG | 150 | Camp offices, Residences, Site Areas | Shelzone 1018. | Talib Ikhusal. | Residual Waste Trench |
| — | — | Food Waste, Residual Waste | Non- Hazardous — | KG | — | Camp offices, Residences, Site Areas | — | No vehicle. | Residual Waste Trench |
| 17/2/15 | 2:30 pm | Food Waste, Residual Waste | Non- Hazardous ✓ | KG | 200 kg | Camp offices, Residences, Site Areas | Shelzone 1257 | Ikhusal Faizan. | Residual Waste Trench |
| 18/2/15 | 3:00 pm | Food Waste, Residual Waste | Non- Hazardous ✓ | KG | 100 kg | Camp offices, Residences, Site Areas | Shelzone 1257 | Talib Faizan. | Residual Waste Trench |
| — | — | Food Waste, Residual Waste | Non- Hazardous — | KG | — | Camp offices, Residences, Site Areas | — | — | Residual Waste Trench |
| 19/2/15 | 3:00 | Food Waste, Residual Waste | Non- Hazardous ✓ | KG | 150 kg | Camp offices, Residences, Site Areas | Shelzone 1257. | Ikhusal Talib Faizan | Residual Waste Trench |
| 20/2/15 | No vehicle | Food Waste, Residual Waste | Non- Hazardous No vehicle | KG | No vehicle | Camp offices, Residences, Site Areas | No vehicle | No vehicle. | Residual Waste Trench |

Environmental Officer: Muhammad Imran Yousaf

H.S.E-Manager: Mr. Kamran Janjua

Team Leader : Mr. Min Sun Choi

Sig:

Sig:

Sig:

Waste Collectors Signatures

Sig:

Sig:

Annex-9

VEGETATION STUDY- KUNHAR

RIVER

147 MW PATRIND HYDRO POWER PROJECT PAKISTAN



QUARTERLY REPORT

STUDY AND MONITORING OF FISH FAUNA OF KUNHAR RIVER

JANUARY-MARCH 2016

Table of Contents

| <u>S #</u> | <u>Head</u> | <u>Page</u> |
|-------------------|------------------------------------|--------------------|
| 1. | Abstract | 2 |
| 2. | Introduction | 3 |
| 3. | Forest Types (Ecological Zonation) | 4 |
| 4. | Vegetation Cover | 5 |
| 5. | Comparison of the studies | 7 |
| 6. | Outcome of the Study | 8 |
| 7. | Possible Impact of the Project | 11 |
| 8. | Recommendations | 12 |

VEGETATION STUDY OF PATRIND HYDRO POWER PROJECT

1. Abstract

The hilly mountain massifs look attractive when they are covered with suitable vegetation type. The mountains that have immature stage of soil formation process are always prone to erosion and landslides if they are disturbed by cutting their base or removing the vegetation cover. For a stable environmental protection and sustainable healthy atmosphere country should have about 25% of its area under the forest cover. Especially the hilly tract which is not suitable for any agricultural crop production must be covered with the suitable indigenous plant species. Patrind Project area lies in the Himalayas subtropical zone with Chirpine as a major associate of the broad leaved trees. Patterns of species composition and diversity in the lesser Himalayan, subtropical forests of the project area is being studied in relation to environmental variables and underlying anthropogenic influence. Forest composition, community structure and diversity patterns are important ecological attributes significantly correlated with prevailing environmental as well as anthropogenic variables.

High deforestation and disturbed regeneration has been noticed in the area.

A sharp decline in forest vegetation occurred with continuously increased levels of human and livestock interference.

During the last three decades, the mainstream view of deforestation in the Hindu Kush-Himalayan region attributed the phenomenon to increased local use due to population growth.

Some of the other issues relevant to low vegetative cover are common property management, including political influence, property rights, and co-management. Main tree uses are firewood consumption and timber extraction from the private and State land. The loss of vegetation is not compensated fully by reforestation and protection resulting into more forest depletion due to population growth.

There is no land use policy implemented in Pakistan, due to which the steep slopes are not wisely used resulting into the massive vegetation loss which ultimately causes the land destabilization. Patrind is not the only area which has become so prone to land erosion, instead all adjacent areas on both sides of the river Kunhar, Jhelum and Neelum are showing the same picture.

Forest cover in Pakistan is only 5% of the total land area (GoP 1991) and is said to be rapidly deteriorating due to unsustainable use of the resources, especially in the mountain regions (IUCN 2002). Another main reason for low tree cover is the high demand for grazing land and fodder for the animals. Local people in the area burn the land after cutting the grass in the months of October and November. This leads to the loss of all vegetative cover on the steep slopes and leaving behind the exposed surface to the mercy of the Nature. The soil loses the water percolation capability hence, giving support to start of gully making and erosion on larger scales. Thus we can say that the original vegetation is almost destroyed due to the heavy grazing, lopping, poor agricultural practices and urbanization. Because of this shortage of vegetative cover, the area is very badly suffering from soil erosion and outlook of the area shows a picture like a naked human being.

2. Introduction

The study is supposed to find out the possible impact of the Patrind Hydro Project on the vegetation and land instability around it. The study covers both the sides of the hill on Patrind intake and Allarra outlet.

The study area is about 10 km up and downstream of river Kunhar from the weir point at Patrind ($34^{\circ} 20' 36''$ N and $73^{\circ} 25' 10''$ E) at an elevation of 2516-3123 ft a.m.s.l) and around the outlet at Alladra ($34^{\circ} 20' 06.05''$ N, $73^{\circ} 27' 18.6''$ E) in AJK. It covers both the eastern aspects on the left bank of river Kunhar and right bank of river Jhelum in AJK. Total Area is about 100 Acres.



Site at Patrind



Site at Allarra

The agricultural production system consists of upper catchments and gullied areas (wastelands), covering some 56% of the area, terraced fields along hillsides (39% of area) and irrigated agriculture (5%). Natural forests and rangelands are the major land use in the upper catchments.

Agricultural production on the terraced fields depends on runoff water harvesting and soil moisture conservation. These terraced fields were created by leveling with bulldozers/manual labour during the last 3-4 decades. Subsidized machinery encouraged the farmers to level the hillsides without considering the requirements for water harvesting and safe disposal of surplus runoff during high rain storms.

3. Forest Types (Ecological Zonation):

The Patrind project area lies in the Sub-tropical ecological zone of the country. This zone is again classified in:

- a) Subtropical Scrub forest with broad leave tree species in the foot hills and
- b) Subtropical Chir pine Forest with a major tree species of Chir Pine.

4. Vegetation Cover

Project site vegetation does not contain any species listed as endangered or threatened by the Government of Pakistan or IUCN. Only two species *Celtis australis* (Bataul) and *Ficus carica* (Enjeer) were found rare in Pakistan but they are listed as common for the rest of the world. The presence of these two species will not be disturbed as they were found above the submerging area and away from the area where trees needed to be felled down. The rest of the vegetation species were found protected and common in Pakistan and for the rest of the world. So it is concluded that there will be no negative impact on a larger scale of Patrind Hydropower Project on conservation status of the vegetation of the area; but the area around the power house site has very badly affected due to the soil cutting and tunnel excavation but project management is taking control measures and stabilizing the slopes with the help of shotcrete, Rock Bolting and by constructing retaining walls.

Following Tree species were documented in the project area both in Patrind and in Allarra:

| <u>Common Name</u> | <u>Botanical Name</u> | <u>Type of Tree</u> | <u>Status</u> |
|---------------------------|------------------------------|----------------------------|----------------------|
| Akhrot (Wallnut) | <i>Juglans regia</i> | Fruit | common |
| Anjeer | <i>Ficus carica</i> | Fruit | rare |
| Batang | <i>Pyrus patia</i> | fruit | common |
| Batcald | <i>Celtis australis</i> | soil binder | rare |
| Beence | <i>salix spp</i> | Firewood | common |
| Ber | <i>Zizyphus mauritiana</i> | fruit | common |
| Chir | <i>Pinus roxburglii</i> | Timber | common |
| Dhaman | <i>Grewia oppositifolia</i> | Fodder | common |
| Drawa | <i>Ailanthus anus</i> | firewood | common |
| Drek | <i>Melia azadrach</i> | firewood | common |
| Kangarr | <i>Pistacia khunjak</i> | soil binder | rare |
| Kau | <i>Olea cuspidate</i> | Agri tools, | common |
| Kiker | <i>Acacia nilotica</i> | Firewood | common |
| Nim | <i>Azadirachata indica</i> | Firewood | common |
| Phagwarr | <i>Ficus Palmata</i> | soil binder | common |
| phulai | <i>Acacia modesta</i> | firewood | common |
| Pipal | <i>Ficus religiosa</i> | Firewood | common |
| Robinia | <i>Robinia pseudoacacia</i> | firewood | common |
| Shahtoot | <i>Morus alba</i> | Fruit | common |
| Sherol | <i>Alnus nitida</i> | Firewood | common |
| Snatha | <i>Dodonaea viscosa</i> | soil binder | common |
| Talli (shisham) | <i>Dalbergia sisso</i> | furniture wood | common |

The main contributor grass species were *Heteropogon contortus* (Sariala), *Cenchrus ciliaris* (Dhaman), *Desmostachya bipinnata* (Dab ghaas), and *Cynodon dactylon* (Khabbal).

Comparatively low vegetation cover was recorded in the flat area and high from steep slope areas (74.29%) followed by gentle slope and gully bed areas.

5. Comparison of the studies

Vegetative cover of the area has been affected by the excavation work on both sides of the project. The area on inlet side has been treated by concrete on the hills on both the sides of the river. Some area is still affected just close to inlet on the right side of the river but that has also been treated with the help of shotcrete and rock bolts. The landslide adjacent to the project area has further expanded and more tree cover has been damaged but the damaged has been compensated by planting different species of trees in the affected area by the project management. Almost 900 trees were planted in the area to avoid soil erosion and land sliding in future. Some areas on the outlet have been treated with concrete work reinforced with horizontally inserted iron bars.

Some Remedial actions were taken to control these landslides. If this area is planted with some useful plants with the involvement of the custodian communities and they are made responsible for the protection of these plants then the danger of fire could be reduced to minimum level. The fire in the area has caused damaged about one year before. There is a need to address this issue and fire control measure should be taken before the dry season starts in June.



The recent picture of March 2016



Picture of October 2014

The above two pictures show the difference of the slide adjacent to the project area at powerhouse side. Vegetative cover has visibly decreased and the land slide has expanded both horizontally and vertically which is a very clear indication of the adverse impact. Some attempt has been made to control the landslide in the form of slope stabilization around and inside the project area and by the help of planting different species of deep rooted trees and by the help of shotcrete, rock bolts and retaining walls to avoid erosion and slide in future.

6. OUTCOME OF THIS STUDY

It has been observed that more Chirpine trees have been damaged in the adjacent area near the outlet of the tunnel. Some more mature trees are leaning on one side and they may get damaged in the near future. The slide around the project area expanding and recently some of the remedial measures are taken to cope up with the land sliding issues by planting different trees in the area. Precautionary measures are required to timely control the threat of fire hazard especially before the drought period when the chances of fire are much higher.

Treating with short creating instead of treating it with plantation and bio engineering will not be a permanent solution to it. The project is mostly looked after by the Engineers and to them, it is the easiest and permanent solution for treating the slides. Blasting inside the tunnel causes a vibration of quite high level which affects the course of spring water and destabilizes the immature rock formation of the hills but almost all of the tunnel construction is completed

and there is no need of blasting again and if blasting is to be done than it would be controlled blasting that will not affect the surrounding areas. Project is most probably making arrangements to address the issue of water availability to the affected communities by providing the clean water through the installation of tube wells.

The design of the outlet of the power plant has been changed and the location has also been shifted most probably due to the instability of the hillside. The site so left between the **First Corner** and the **Second Corner** below the **Third Corner** seems to be under the danger of land erosion/ sliding and needs immediate attention. The planting season is not confined to February only. If potted plants are planted here they will have positive impact though not that much as would have been with the combination of bioengineering works.



The trees harvested this time have been replaced by the new saplings which are the basic requirement of the area cleared.

The present status of vegetation on Patrind side does not depend upon the water of river Kunhar but it depends on natural precipitation or water channels taken out of the side nallahs. So reduction in water regime downstream will not affect the vegetation of the area. The average biomass for forage that will be submerged under water after the construction of weir was calculated as 3,468 Kg/ha. The total biomass to be inundated is estimated to about 200 tons. (*Farmer Study Report for Patrind project*)

The area affected on the weir site due to inundation is 57.2 ha and on the powerhouse site is 5.5 ha which will come under construction.



Latest position (March 2016) of Patrind side of the project area.

7. Possible Impact of the Project

The result indicate that landscape, the nature of the rock and the redistribution of rainfall water by run-off are the main sources of spatial variation in the study area. The construction of the dams will positively affect the groundwater at the upstream and negatively at the downstream of Patrind. Downstream vegetation composition along the banks will make a huge difference as some area which is under river water will have no more water and some invasive plant species may appear on the tract. Impoundment above the dam will have some impact on the limited local ecology of the area due to increase of the moisture content and submerging some of the plant species of the area. This will also have a negative impact on the spring waters on and around the tunnel, affecting the vegetation fed by these spring waters. Ground water will be affected downstream of the Patrind, but apparently dependence on that water is not existing; so no social impact is expected.

Soil erosion and landslides are the major threats in and around the project area which needs immediate attention. If these are not stabilized now, these can become big hazard in the future but project management has taken some remedial actions to cope up with the land sliding and erosion issues.

8. Recommendations

Since the area close to the tunnel and inlet and outlet of the tunnel where working concentration is high, the impact on the vegetation and water courses will have negative

impact. The lake will submerge some of the vegetation due to rise in water level. Similarly downstream the water area will reduce so new species may appear along the banks of the river course which may be the invasive species damaging the local ecosystem. There is a need to compensate this loss by some possible means listed below:

1. Tree species of alternate requirement of water and soil should be planted in these area like shrole, salix be replaced by robinia, walnut
2. Areas of high working concentration (in-let and outlet of the tunnel) are facing the problem of soil erosion and these have been treated by concrete. It was suggested in the last almost all the study reports to initiate the Bio-engineering technology to control these slides effectively which include vegetated soft gabions, vegetated loose stone walls, gabion check dams, live brush wood, check dams, planting, sowing and tufting, dry seeding, hydro seeding, hay seeding, grass sodding, sowing with geo-textile sheets, brush wattles, brush layering, hedge layering, semi-dead fences with live hedges. Total engineering treatment has caused a loss for growing vegetative cover. This will also contribute in the process of global warming and environmental degradation which is not acceptable globally. This adverse effect should be compensated by treating the adjacent slides with Bio-engineering measures which will not only treat the soil but will also improve the environmental status and it is cheaper as compared to concrete work.
3. Forest fires in future may damage the areas inside the fence if it went beyond the control of any one. So it is recommended that;
 - a) Fire control path of 4-5 feet width should be prepared inside the fence and they should be regularly cleared during the dry spell of the year.
 - b) Another way of controlling the fire is that controlled burning should be carried out on the project sites to avoid the fire spread from outside before the dry spell (April, May).
 - c) There is a need of awareness campaign for the community residing around the project sites to avoid burning the forest instead they can grow some useful trees giving them good economic return. Project should support them in the plantation on their land. Project may hire the services of Social Organizer

male and female for a period of at least three months to address this issue properly.

- d) Deep rooted and web rooted species should be planted inside and outside the project site to avoid the exposure of the soil as they are the fire resistant species like, Anjeer, Phagwarr, Dhaman, Kahu etc.
- 4. The slide area around the power house site is very badly affected by the erosion and the rate of erosion is increasing with the passage of time. This may affect the project site as well. This issue is addressed and proper slope protection is being carried out to control the erosion and land sliding
- 5. The area shifted between corner-1 and Corner-2 have been concreted but the original design map shows a different picture of being green with vegetative cover after the completion of surge shaft the damage will be stopped.
- 6. Investigate the feasibility of providing financial and other assistance to encourage landholders to prepare vegetation plans, and to actively protect and manage the native vegetation on their properties around the project area. Review planning enforcement activities and resources with a focus on native vegetation. If necessary, increase monitoring and patrols, and publicize a 'no tolerance' approach to illegal clearing.

Annex-10

FISH STUDY - PATRIND HPP

Fish Study
Patrind Hydro Project



JANUARY-MARCH 2016

TABLE OF CONTENTS

| | |
|--|----|
| 1. Background | 2 |
| 2. Introduction | 2 |
| 3. The Fish | 4 |
| 4. Fish catch and fishery potential | 8 |
| 4.1. Fish Catches and species composition | 10 |
| 4.2. Other Fish species of river Kunhar reported in the past | 11 |
| 5. Sport and recreational fishery | 12 |
| 6. Fisheries Status of River Kunhar in view of locals | 12 |
| 7. Field Results | 13 |
| 7.1. Point I (Boi) | 13 |
| 7.2. Point II (Domel Boi) | 14 |
| 7.3. Point III (Parri) | 15 |
| 7.4. Point IV (Diversion Outlet) | 16 |
| 7.5. Point V (Diversion Intlet) | 17 |
| 7.6. Point VI (Dumping Site)..... | 18 |
| 8. Management and Conservation | 21 |
| 9. Comparison | 22 |
| 10. Recommendations..... | 25 |
| 11. References | 27 |
| Table-1 showing water parameters | 8 |
| Table-2 Showing record of fish caught at each sampling point | 20 |
| Table-3 Comparative number of fish caught at sampling points... | 24 |
| Graph: Showing comparative fish catch under each study..... | 25 |

Background

Hydro projects always create an adverse impact on the aquatic ecosystem both in upstream and downstream of the infrastructure established for the power generation. The degree of impact depends on the blockage percentage of the water and release downstream. The Patrind Hydro Power generation project is based on the diversion of River Kunhar through a tunnel and dropping down into River Jhelum in Muzaffarabad Azad Jammu & Kashmir. This diversion will make a water pool at Patrind behind the concrete structure and almost dry up about 13 km of the Kunhar river system downstream.

This study deals with exploring the possible impact on the fish fauna of river Kunhar at and around Patrind Hydro Power Project area. The study is a continuous process with an interval of three months. This gives us the information of seasonal changes and changes of the same period during different years.

The river blockage has not yet been done on the river Kunhar but the course of river has been changed at the weir site of the project where a diversion tunnel has been constructed at first stage of the project to get space for the construction of weir. The reported fish fauna of Kunhar River shows the wide diversity of fish species in it but the study carried since September 2013 shows that only two fish species are present in the study area. Study in almost all the seasons have been carried out and no any other fish species could be caught or seen except the versions of the locals giving the evidences of the presence of *Glyptothorax* species and *Cyprinus carpio* (Gulfam) species in Nallah Boi.

INTRODUCTION

The study has been carried out on six fixed points of the river Kunhar starting at 34° 18' 18.56" N and 73° 26' 45.56" E to 34° 20' 40.54" N and 73° 25' 04.27" E, covering about 10 km up and down the Weir at Patrind.

The right side of the river Kunhar area is located in the province of Khyber Pakhtunkhwa Province, in the north-west of Pakistan and is largely located on the Iranian plateau and Eurasian land plate, while peripheral eastern regions are located near the Indian subcontinent and this has led to seismic activity in the past. The left bank of the river Kunhar belongs to

the State of Azad Jammu & Kashmir. Most of the catchment area of River Kunhar is situated in Kaghan Valley of KPK.

The Khyber Pakhtunkhwa province covers an area of 74,521 km² (28,773 sq mi). According to the 1998 census, the total population of Khyber Pakhtunkhwa was approximately 17 million out of whom 52% are males and 48% females. The density of population is 187 per km².

The northern part of the province is snowy in winters, and also experiences heavy rain falls. Its valleys Swat, Kaghan, Chitral and Kohistan are surrounded by rugged mountains and have temperate climate, including cold winters. Upper reaches of rivers in these valleys carry clean cold water and are suitable for trout and schizothoracines (snow trout). Several lakes and reservoirs also provide suitable conditions for cold-water fish. As one moves to south, transitional or semi-cold waters are present, with snow trout and mahseer fish species presence. Further south and at lower altitude warm water fish species prevail.

There is subsistence cold-water capture fishery, but no statistical data are available on its extent. Recreational/sport fishery has been steadily increasing. In 1990 cold-water fish catches were estimated at about 200 t/yr. (Akhtar, 1992), with the bulk formed by snow trout and indigenous small fish. In the same year Madyan fish farm produced 7.5 t and the private sector about 5 t of trout. With the completion of two more fish farms of trout fish in Swat and Kaghan, the private sector is expected to produce 50 t annually.

Brown trout introduction and subsequent stocking in Kaghan and Chitral at the beginning of the 20th century were very successful. Starting in 1962, at least three schemes initiated for the development of trout in five districts, i.e. Mansehra, Swat, Dir, Chitral and Kohistan, resulting in five trout hatcheries. It is estimated that about 40 percent of the total fry produced from these hatcheries are released in various natural water bodies. Sport fishery has promoted tourism and its economic role is well established (Akhtar, 1992). It is recognized that at present the trout industry in Khyber Pakhtunkhwa is more advanced than elsewhere in Pakistan. There are now three trout hatcheries in Chitral Valley. The largest trout hatchery-cum-farm is in Madyan in Swat Valley. There is a hatchery at Kalkot in Dir, and the Shinu hatchery in Kaghan, the oldest one in the Province. A new hatchery has been completed at Dobar in Kohistan.

No attention has been paid to develop hatcheries for the native cold water fish species anywhere in Pakistan. Province of Punjab has developed one Mahsheer hatchery and AJK Fisheries department is also planning to develop one Mahsheer hatchery to restock it in Poonch River and its tributaries. Poonch River has been declared as National Park very recently to improve the conservation status of the river with special emphasis on Mahsheer. Nepal has worked on producing juvenile of *Shizothorax* species in Pokhara region but there is no plan of developing such hatcheries in Pakistan, AJK and Gilgit Baltistan

The river Kunhar flows in district Mansehra with a stretch of about 250 km. The river carries clear water with little silt during the winter (September-March), but it causes heavy floods during the monsoon season and summer snowmelt.

THE FISH

The fish species distribution in the Himalayan streams depends on the flow rate, nature of substratum, water temperature and the availability of food. In torrential streams Sehgal (1988) identified several zones on the basis of dominant fish species and the hydrographical features.

Menon (1954) related the distribution pattern of Himalayan fish to morphological characteristics which enable them to inhabit the torrential streams. He recognized six major groups: (a) fish dwelling in shallow, clear cold waters in the foothills without any striking modifications to current: *Labeo*, *Tor*, *Barilius* and *Puntius*; (b) fish inhabiting the bottom water layers in deep fast current, with powerful muscular cylindrical bodies: schizothoracines and the introduced trouts; (c) fish sheltering among pebbles and stones to ward off the strong current: *Crossocheilus diplochilus*; (d) fish sheltering among pebbles and shingles in shallows, with special attachment devices: the loaches *Noemacheilus*, *Botia* and *Amblyceps*; (e) fish which cling to exposed surfaces of bare rocks in slower current, with adhesive organs on their ventral surface for attachment to rocks: *Garra*, *Glyptothorax* and *Glyptosternum*; and (f) fish which cling to the exposed surfaces of bare rocks in fast current, with limpet-shaped bodies and mouth, gills and fins highly modified to suit the habitat: *Balitara*.

Hora (1955) and Menon (1962) studied the evolution of schizothoracines and concluded that they appeared during the first interglacial period, when turbulent streams formed in Central Asia, necessitating the reduction of scales which is characteristic of schizothoracines.

Primitive forms of this group occur today in South China. During the favourable environmental conditions of the second glacial period they migrated westwards as far as Kashmir and Sistan. The great proliferation of genera and species of the sub-family Schizothoracinae probably occurred during the second and subsequent interglacial periods. Today the schizothoracines are mainly Central Asiatic in distribution although a few species are present also along the southern face of the Himalayas.

The eastern Himalaya has a greater diversity of cold-water fish than the western Himalayan drainage. For the whole Himalayas, 218 species are listed (Menon, 1962). The subsistence and commercial fisheries exploit carps (*Labeo* and *Tor* spp.), lesser barils (*Barilius* spp.), schizothoracines (*Schizothorax* and *Schizothoraichthys* spp.), garrids (*Garra* spp.) and sisorids (*Glyptothorax* and *Glyptosternum* spp.). The other genera are small-sized and of low economic value. The exotic brown trout (*Salmo trutta*) has established itself in some areas of the Himalayas like in Kaghan.

The main factors which influence fish life in the Himalayan streams are: (i) current velocity; (ii) fluctuation in water discharge; (iii) water temperature and dissolved oxygen level; (iv) substratum; (v) shelter from the current; and (vi) food availability represented mostly by organisms clinging to and growing on rock and stone surfaces in fast current.

Snow trout, a cold water riverine and short migratory fish is locally known as malli. It belongs to the family Cyprinidae and sub-family Schizothoracinae which are widely distributed in the Himalayan and sub-Himalayan region and much of the rest of Asia. Altogether 28 species of snow trout are reported in Himalayn river waters but only two of genus *Schizothorax* are recorded in the study area of river Kunhar. *Schizothorax curvifrons* and *Schizothorax plagiostomus* are high value sport fish and are common in river Kunhar. Both the species are phytophagous fish and has developed a special mouth to scrape the algae attached on stones. They spawn twice a year during September/October and March/April, but September/October is the best season for spawning. Clear water, stony bottom of creeks composed of fine pebbles and gravel, and water flow of 2.8-4 m/sec, pH 6-8 and dissolved oxygen concentrations of 8-15 mg/L form good spawning conditions in the natural environment.

The need for shelter from the current has led to territoriality. Schizothoracines chase intruders to defend the limited food resource and available shelter. Such a behavior develops after the

young fish emerges from the eggs laid in gravel. During winter months all size groups of Schizothoracines are present in pools when the water level is at its lowest and water is highly transparent. Such pools are present in the rivers Jhelum, Neelum, Kunhar and Swat. This is one of the devices employed by these species to confuse predators. When a few fish are caught in a cast net, the rest disperse.

To cope with the steep fall in temperature in winter months schizothoracines migrate from headwaters to lower altitudes where they represent a sizeable part in fish catches in large rivers and their tributaries. The rise in temperature in Kashmir and Kunhar streams from near-freezing level to 10-18°C during May-June induces *S. plagiostomus*, *S. longipinnis* and *S. curvifrons* to spawn. During the upstream migration the fish still finds itself in waters of low temperature of 8.0-9.5°C, owing to the steady influx of snow-melt water. This induces the species to migrate to and spawn in the side streams or point of warm and cold-water confluence, which receive warmer ground water of 17.5-21.5°C. In the same drainage *S. plagiostomus* and *S. curvifrons* migrate downstream to the lowermost reaches where it spawns from September to December at 15.0 to 21°C. These observations indicate that in some schizothoracines multiple spawning is determined by temperatures and flow rates optimal for egg laying. The eggs are large-sized (3.0-4.0 mm diameter) and sticky in nature. They are laid in shallow pools (50-70 cm depth) and remain adhered to the substratum until the hatching of fry.

The fast-swimming species of Mahseer, trout and schizothoracines expend much energy in maintaining an upright position in the turbulent and fast current. The frequent occurrence of spates has proved deleterious to breeding and propagation of cold-water fish. The scanty population as indicated by the low density of fish in the Kunkhar and Neelum rivers may result from the passage of these rivers through deep and narrow gorges, and the presence of cold glacier- and snow-melt water.

The fluctuating discharge of water and drying out of streams, leaving only isolated pools or no water at all, is another important matter. A general observation during the last studies on seasonal fluctuation in river discharge of Kunhar river system indicate that the range of mean flow from October to March (winter months) represents only 8-10% of the total annual flow. There are also variations from year to year depending on the winter and monsoon precipitation. Reduction of torrential streams to stagnant pools exposes the fish to terrestrial

predators and to depletion in dissolved oxygen concentrations, especially when autumn leaf fall takes place. However, due to low temperature, the level of dissolved oxygen may not fall below the optimum required by cold-water fish (7.0-8.0 mg l). As soon as the flow is restored with spring rains and snow-melt water a rapid re-colonization of the stream takes place.

Schizothorax and *Schizothoracichthys spp.* are dominant among the cold-water fish in river Kunhar in terms of catch and abundance in all seasons. The substratum consists of boulders, stones, gravel and patches of aquatic vegetation in the pools.

As a result of this study in river Kunhar it came out that a gradual increase in water temperature and pH corresponds to a decrease in dissolved oxygen, decline in the density of nymphs of mayflies and stoneflies, but in an increase in larval and adult aquatic beetles. The information collected during expeditions is based on spot measurements and it does not represent average values. The following parameter ranges for the Kunhar River were recorded at six sampling points during March 2016. Following table shows the result; transparency; pH; water temperature (°C); dissolved oxygen;

Table-1 showing water parameters

| S No | Point | Dissolved Oxygen (ppm) | pH | Temperature °C | Transparency |
|------|-------------------|------------------------|-----|----------------|--------------|
| 1 | Boi | 10 | 6.5 | 9.9 | 0.9 |
| 2 | Nallah Boi | 10 | 7.5 | 10.5 | 0.8 |
| 3 | Parri | 10 | 6.5 | 10 | 0.9 |
| 4 | Tunnel exit | 12 | 6.5 | 10.1 | 1 |
| 5 | Tunnel Inlet | 12 | 6.5 | 10.1 | 1 |
| 6 | Tarchella/Shorran | 13 | 6.5 | 10.1 | 1 |

Fish catch and fishery potential

The fishing activities take place for 8 months of the year during spring, summer, autumn and the early winter months (interview with locals and fishermen). There is usually no fishing during floods and part of the winter season. The full-time fishermen fish for 6 months and

catch 0.2-1.2 kg per day. The individual catch is around 126 kg per person per year. The 6 professional part-time fishermen generally fished 2-5 months per year and were laborers, mechanics, a few businessmen and a few job holders. The fish catches ranged between 0.2 and 0.5 kg per person with an average catch of 43.5 kg per person per year. However, the electro fishing fishermen catch fish in the range of 2-4 kg, with an average of 315 kg per fisherman per year, and they catch the fish in groups of 3-5 people. Basically, occasional fishermen are non-fisher groups and fish for recreation. Such groups fish 2-10 times per year and catch 0.2-0.5 kg per day, with an average of 2.1 kg per person per year for consumption. The fishermen fish in the main Kunhar river system and its tributaries. The estimated total length of the river with its tributaries is 214 km other than the trout area with an average water depth of 2.2 m.

Fisheries in the Himalayan rivers can be divided into (a) subsistence fishery; and (b) sport/recreational fishery. Fish production in mountain streams is low and therefore any commercial fishery is on a very limited scale. The low biological productivity results in the prevalence of small-sized fish, except in pools where fish have some shelter and resting place.

The fishing methods using nets, traps, electro fishing gear and poisons are simple but well-suited to the turbulent nature of the streams. Cast nets of 1.0-2.0 m diameter, with mesh sizes 1.2 to 3.0 cm bar to bar and sinkers of a total weight of 5 kg are the most common gear used. The sinkers allow rapid settling of the net at the bottom, thus preventing it from being carried downstream by the rapid current. The fisherman upturns the stones on the stream bed covered by the net, which makes the fish come out of their hideouts below the stones and get trapped in the peripheral pockets of the net. The other types of nets used are: drag nets operated in conjunction with stake net (*kadh*), seines, stake nets, bag nets (*kochbi*), and some other types.

The various poisons used are lime, sap of *Euphorbia rogleana*, powdered seed of *Xanthoxylum alatum* and *Cascaria tormentosa*, boiled tea leaves, etc. In addition, spears, horse hair nooses, harpoons with 4-5 barbed points and grain fishing are also used in different waters of the local rivers.

Use of explosives and electro fishing gear in river Kunhar is usually done by the non-professional fishermen who visit the areas in groups. They damage the point very badly and

stay at the site for one to two hours, catch the easy accessible fish and leave the other dead fish to flow away with fast current of water.

Another factor of ecosystem disturbance is the disposal of dug material into the river Kunhar and dumping place near Patrind. The material was mixing with river water especially during the rain. Now the loose soil has been strengthened by stone pitching and iron wire gabions. This will definitely improve the condition and during the rise in water more erosion will not take place and whatsoever the ecosystem condition is today will remain intact in the future.



Fig 1&2: Gabion fixing and stone pitching at dumping site.

Fish catches and species composition

Two professional fishermen, Mr. Muhammad Haneef and Mr. Muhammad Arshad were engaged for fishing in the river Kunhr at fixed sampling points. Fishing in the Kunhar River using cast nets of 1 m to 1.5 m diameter recorded a catch of two fish species only. The catch comprised mainly of *Schizothorax plagiostomus* (75%) followed by *Schizothorax curvifrons* (25%). The water is shady to clear and fish catch was very low at all points unlike the last year during the same month (March 2014). The low fish catch trend for the last three studies shows the increasing impact of the weir. The diversion tunnel has very rapid water flow velocity and chances of fish revival in this water are minimum. Second thing is that upward migration of the fish is impossible from here. This creates a big impact on the fish spawning as it migrates during the summer season and finds suitable ground for spawning during

September. So the spawning of the fish does not take place for the fish 2 kilometers downstream of the weir. This shows that fish existence at these places will steadily be disappeared in the near future.



Fig 3. Fisherman Mr. Mohammad Haneef



Fig4. Fisherman Mr. Muhammad Arshid

Other Fish species of River Kunhar reported in the past:

Family: Salmonidae

Oncorynchus mykiss {*Salmo gairdneri* }(Rainbow Trout)

Salmo trutta (Brown Trout)

Family: Cyprinidae

Schizothorax esomus

Schizothorax plagiostomus

Schizothorax micropogon

Schizothorax curvifrons (Snow Trout)

Tor putitora

Tor tor

Labeo spp

Cyprinus carpio

Family: Sisoridae

Glyptothorax kashmirensis

Sport and recreational fishery

Trout

The trout, which is now acclimatized in the upper reaches of River Kunhar (upstream of Jared in Kaghan), is permitted to be caught on rod and line using both artificial and live baits. Special bylaws have been formulated under the Fisheries Act in the Khyber Pakhtookhwa province. They regulate the fishing season, bag limit and prescribed baits.

Organized brown trout fishing is confined mainly to the upper reaches of river Kunhar. As per fishing regulations, 'dry and wet' fly spinning, artificial and natural worms, etc. are the allowed baits for brown trout fishing. The number of anglers to be permitted in each beat is fixed on a daily, weekly or seasonal basis. The fishing season extends from March to October every year. The minimum legal size of trout to be caught ranges from 25-30 cm. The bag limit ranges from 5-7 fish of 25 cm and above in length. The number of undersized fish caught by each angler has to be returned in the river. However, there are very few anglers who follow such instructions.

Fisheries Status of River Kunhar in view of locals

During the last few studies, few locals were also interviewed who are having some water mills (Gharat) just beside the river or nallahs. Among them were Mr. Khaqan Hussain Shah, Mr. Husnain Gilani and Mr. Mohammad Sadiq. According to them a gradual decline in the fish catches have been observed during the last two decades. Use of explosives and poisoning are the major two reasons and electro fishing has also been observed for the last three years in River Kunhar and Nallah Boi. The people responsible for doing so are mostly non-resident visitors not the locals. Most of the small size fish so killed flows down in river Kunhar. Another reason of decline in the fish population, according to them, is the predation of local fish by exotic trout fish in the upper reaches of the Kunhar. The decline due to construction of dam has also been noticed by the locals. This time the water mill was closed and no relevant local could be found for such chat.



Fig 5: Interview with locals

Field Results:

Point-I (Boi)

First sampling point of the study is situated at $34^{\circ} 18' 19''$ N, $73^{\circ} 26' 44''$ E at 2422 ft of elevation above sea level. The water level is moderate and it is more or less clear because of no rain for the last few days. No fish could be caught in the cast net by both the fishermen. This is the same result as was during the last study during December 2015.



Fig 6: Sampling at point-I

Point-II (Domel Boi)

This sampling point is situated at $34^{\circ} 18' 36''$ N, $73^{\circ} 26' 43''$ E at 2398 ft of elevation above sea level. This is the point where fish can migrate upstream in the Boi Nallah during the spawning period and can have little impact of low river flow when tunneling of the water starts. Unlike before, the nallah water was very clear as compared to the relatively turbid water of river Kunhar. No fish could be caught here at this point. According to the locals, evidences of existence of *Glyptothorax spp* and common carp (*Cyprinus carpio*) were found in the Boi nallah.



Fig 7: Sampling at Point of confluence of nallah



Fig 8: Clear water of Nallah Boi

Point-III: (Parri)

This sampling point is situated at $34^{\circ} 19' 47''$ N, $73^{\circ} 25' 35''$ E at 2475 ft of elevation above sea level. The river water is almost clear at this time of the year. The small creek joining the river is also clear. Chance of fish catch was expected here and proved correct. Three fish could be caught here and all of them were *Schizothorax plagiostomus*. Water temperature and pH is given in the table below



Fig 9: Sampling at point-III, Parri



Fig 10. Fish in Net at Parri

Point IV: (Outlet of river diversion)

The point is situated at $34^{\circ} 18' 19''$ N, $73^{\circ} 26' 44''$ E at 766 meters of elevation above sea level. The pool existing here last time has disappeared due to new construction and enforcement of the embankment. Difficult access was possible to the river and general observation shows that there is no chance of existence of live fish as the water flow speed

was very high. This diversion tunnel has a definite impact on the fish production but to a maximum of 800 meters downstream.



Fig9: Sampling Point at outlet before



Fig 10:Rapid water flow at Outlet

Point-V: Diversion Tunnel Inlet

This is the point situated at $34^{\circ} 20' 36''$ N, $73^{\circ} 25' 08''$ E at 2615 ft of elevation above sea level. This is the inlet of the diversion tunnel. One small sized fish, *Schizothorax curvifrons* could be caught here. Still the impact on aquatic life is not very high as the lake has not developed and course and flow of water has not changed here. When the lake will grow after construction of Patrind weir, this can harbour the Rainbow and Brown trout. If carefully planned, this can become commercial activity but needs expert inputs. There is another tunnel is almost completed which will carry through the overflow or released water. A concrete pond construction is underway at this place which is supposed to hold the water and control the speed of water to avoid any side damage. This means upward migration of fish will not be possible, hence, the impact on the survival and spawning of the fish will be very high during the operational stage of the project.



Fig11: Sampling at inlet of water diversion tunnel Fig 12: Inlet position

Point-VI Dumping Point

This is the point situated at $34^{\circ} 18' 19''$ N, $73^{\circ} 26' 44''$ E at 776 meters of elevation above sea level. This is the dumping site of the disposal from the tunnel. This a potential site of the lake emerging due to damming on the river at Patrind. No fish could be caught here. There is a small pool at the right side of the river with a junk of algae. When this algae was disturbed a plenty of small juveniles of *Scizothorax* species came out and moved around. This is a clear indication of suitable wares for fish production and if not disturbed for a longer time. These fry of the fish will be washed away with the rise of the water of River Kunhar and their survival cannot be assured when they pass through the fast flow of water through the diversion tunnel. A good development noticed during this study is that the sides of the dump are strengthened by stone pitching and wire stone gabions. This is the measure taken to control the soil erosion due to the rise in water level during the blockage of water at the weir point. Most of the area will submerge at this point and side cutting danger was very high.

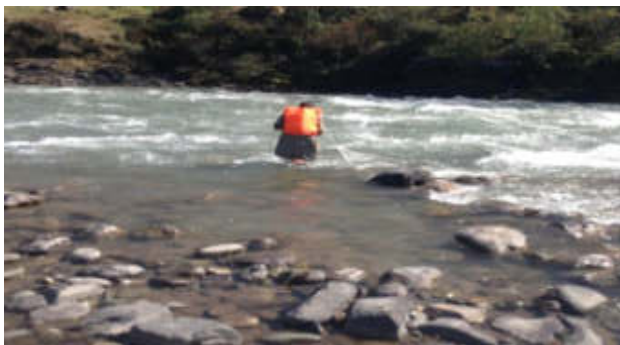


Fig12: Sampling at point VI



Fig 13: Rich algae at the side water of the river

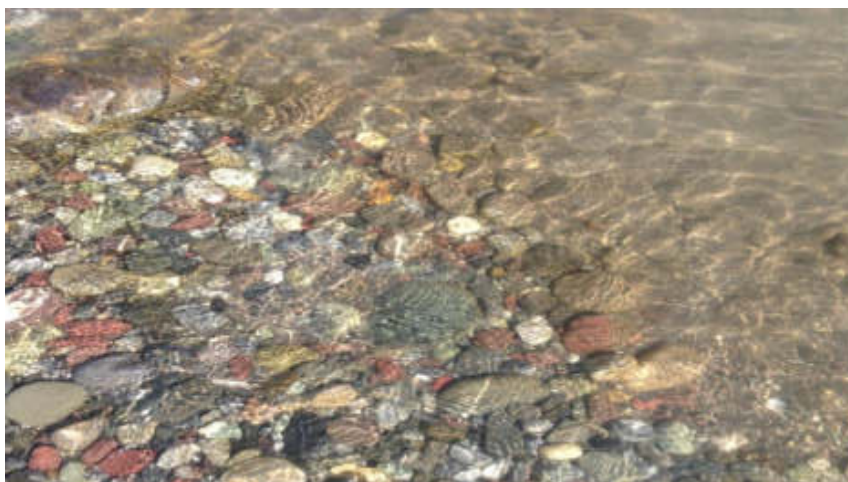


Fig 14: An ideal spawning place with gravels at Point VI

Table-2 Showing record of fish caught at each sampling point

| S no. | Name of Species | Weight gm | Length inch | Remarks |
|-------------------|----------------------------------|-----------|-------------|-------------------------|
| Point 1 | | | | |
| | | | | No fish could be caught |
| Point 2 | | | | |
| | | | | No fish could be caught |
| Point 3 | | | | |
| 1 | <i>Schizothorax plagiostomus</i> | 166 | 9 | |
| 2 | --do-- | 260 | 12 | |
| 3 | --do-- | 273 | 12.5 | |
| Point 4 | | | | |
| | | | | No fish could be caught |
| Point 5 | | | | |
| | <i>Schizothorax curvifrons</i> | 89 | 7 | |
| Point 6. | | | | |
| | | | | No fish could be caught |
| Total Fish caught | | | | |
| | <i>Schizothorax plagiostomus</i> | | 3 | |
| | <i>Schizothorax curvifrons</i> | | 1 | |

Species composition

Schizothorax curvifrons 1

Schizothorax plagiostomus 3

MANAGEMENT AND CONSERVATION

Conservation and river system management has remained a very big issue all over Pakistan. Over the years uncontrolled and often indiscriminate fishing in the largely unmanaged river and streams has resulted in a sharp decline in catches of the important sport and subsistence fish. The increasing use of river water for irrigation, hydropower production, municipal and industrial purposes, and the inputs of pollutants also has a very negative impact on fish stocks. Among the difficulties that fishery managers are facing today is the shortage of data for a number of rivers and even whole areas of Himalayas. The most essential requirement is to estimate the resources which would enable the fishery scientists and planners to formulate a management policy. Another and an increasingly important aspect, is the need to evaluate the environmental impacts caused by human-induced changes in river and lake catchments, and how these have contributed to the decline in fish stocks. The use of destructive methods of fishing calls for effective enforcement of legislative measures and for education of the fishing community. There is a need to improve the surveillance along the rivers in order to protect fish stocks. In this respect the role of voluntary agencies in conserving stocks must not be underestimated.

Fish ladders constructed on several weirs and barrages to facilitate migration of migratory fish species were found ineffective. The drawbacks of these fish ladders are their steepness and then narrow and inconspicuous inlets. These ladders were found to function as fish traps and as such used by poachers.

While the creation of a reservoir results in the creation of a new habitat for fish, at the same time many endemic species are adversely affected. To resolve this problem, priority should be given to the preservation of the diminished stocks of riverine fish species. This should include enforcement of legislative measures such as closed season, types of nets and mesh size regulation, and also the involvement of voluntary organizations, including fishing associations and clubs, in an effort to maintain the fish stocks at a healthy level. The stocks should be enhanced through regular releases of hatchery-produced fingerlings. Only in this way can the rising demands from subsistence and sport/recreational fishermen be satisfied. A programme of stream improvement to maintain optimal conditions for cold-water fish is also

needed, especially where such streams have been impacted by dams, channelization and pollution.

The practice of protecting fish stocks of brown trout and schizothoracines during the low water level period by creating deep pools, covering them with tree branches and protecting them from poaching, also has proved beneficial. The best way of improving the trout and schizothoracines fishery in rivers and lakes is to regularly stock the waters with yearlings produced in hatcheries.

There is also need to improve infrastructure for recreational and sport fishermen, as this would attract more tourists to the areas. Kaghan Valley has already such facilities. There is a need to develop trout facility in Patrind when a pool is expected to appear as a result of Weir construction. This pool will change the ecology of the river system both up and downstream and some fish species are likely to disappear as a result of this. Permanent stocks of brown trout are required to be established in the near most suitable water to stock the fish in the upcoming lake. At present Kaghan Valley has 203 km of streams available for trout fishing. It is common knowledge that fishing tourism improves the economic status of a region. It is estimated that the economic benefits of sport fishing for trout is quite high and an angler spends about Rs. 2000 per week during the tourist season.

Comparison

There is a very clear difference in the results of the early studies and the last three studies which shows that the impact is very significantly appeared on the aquatic environment of the River Kunhar. Significant changes in the fish catch and quality of water observed during the study shows that the impact of diversion at the weir point is growing gradually and will be at the peak after the complete or high blockage of water. This is mainly because of the ecology of the river has started changing. The major change in ecology is expected after the weir construction and obstruction on the river flow. This will affect the migration of the fish down and upstream and all breeding grounds will highly be affected downstream. The species composition may change and some species may disappear with the change of river ecology.



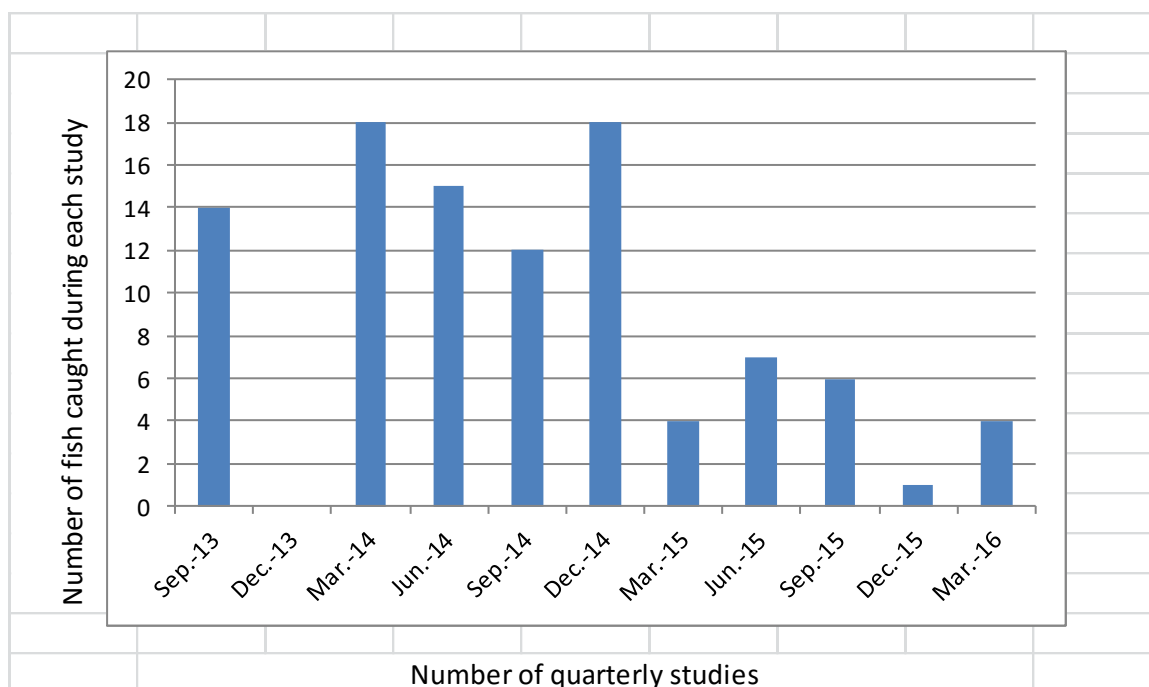
Fig:15: Roaring water coming out of the diversion tunnel

Table-3 Comparative number of fish caught at sampling points

| Period | Point | No. of fish | Period | Point | No. of fish | Period | Point | No. of fish |
|-----------------------|-------|-------------|-----------------------|-------|-------------|-----------------------|-------|-------------|
| July-September 2013 | 1 | 3 | July-September 2014 | 1 | 0 | July-September 2015 | 1 | 4 |
| | 2 | 6 | | 2 | 4 | | 2 | 1 |
| | 3 | 4 | | 3 | 1 | | 3 | 1 |
| | 4 | 0 | | 4 | 2 | | 4 | 0 |
| | 5 | 1 | | 5 | 3 | | 5 | 0 |
| | 6 | 0 | | 6 | 2 | | 6 | 0 |
| Total: | | 14 | | | 12 | | | 6 |
| October-December 2013 | | | October-December 2014 | 1 | 6 | October-December 2015 | 1 | |
| | | | | 2 | 5 | | 2 | |
| | | | | 3 | 0 | | 3 | |
| | | | | 4 | 4 | | 4 | |
| | | | | 5 | 0 | | 5 | 1 |
| | | | | 6 | 3 | | 6 | |
| Total: | | | | | 18 | | | |
| January-March 2014 | 1 | | January-March 2015 | 1 | 2 | January-March 2016 | 1 | |
| | 2 | | | 2 | 0 | | 2 | |
| | 3 | | | 3 | 0 | | 3 | 3 |
| | 4 | | | 4 | 0 | | 4 | |
| | 5 | | | 5 | 0 | | 5 | 1 |
| | 6 | | | 6 | 2 | | 6 | 4 |
| Total: | | | | | 4 | | | |
| April-June 2014 | 1 | 5 | April-June 2015 | 1 | 3 | April-June 2016 | 1 | |
| | 2 | 7 | | 2 | 1 | | 2 | |
| | 3 | 4 | | 3 | 1 | | 3 | |
| | 4 | 0 | | 4 | 0 | | 4 | |
| | 5 | No access | | 5 | 0 | | 5 | |
| | 6 | 2 | | 6 | 2 | | 6 | |
| Total: | | 18 | | | 7 | | | |

Fig 20: Showing comparative graph of fish catches during each study

The graph given below shows the comparative picture of the fish catches during each study



Recommendations

- Fish catches in the Kunhar River have been declining because of the use of illegal fishing methods such as poisoning and use of electro-fishing gears. To preserve the fish stocks, controls should be imposed on illegal fishing practices and a fish sanctuary established. The deep water pools of the Kunhar and its feeder streams should be declared fish sanctuaries for the protection of spawners.
- The Kunhar River catchment has been subject to deforestation, resulting in erosion and silting of streams and rivers. There is a need for land rehabilitation measures to be urgently implemented in the watershed. The incidence of water pollution is increasing in the lower reaches of the river due to the discharges of sewage waste, and the illegal use of insecticides, pesticides and piscicides. Control over such activities must be strictly enforced.
- Habitat improvement is an essential factor for fishery improvement. To avoid seasonal changes of water level, suitable pools should be created under the management of the local development authority. Such a practice will improve the fish habitat quality and avoid the winter desiccation.

- Protection of fish stocks and fishery regulation should be based on periodic assessments of fish stocks. It is high time to enforce the existing fishery law and to restrict the use of nets with less than 2 cm mesh size.
- Early planning and consultation with expert should be initiated to have aquaculture development in the cold water pool appearing as a result of damming on river Kunhar at Patrind.
- During this study it was observed that another concrete pond is being constructed at the outlet to control the rapid flow of water through the overhead flow tunnel. There will be complete check on the migration of the fish. This pond will make another base for the culture of trout as this will have no impact on the other river fish because of its stagnant condition. Survival of local fish in this pond is near to impossible.
- Proper Fish ladders should be provided for the easy up and downward migration of the fish on the lake behind the weir. This is the time to take action in this regard otherwise it will not be possible when the water level will rise due to the start of operational phase of the project.



Fig 16: Weir construction in progress



Fig 17: Excavation of the pond for released water

REFERENCES

1. Mirza, 1975, 1978, 1980, 1990, 2003.
2. Rafique and Qureshi, 1997;
3. Rafique, 2000; Rafique, 2001; Rafique et al., 2003).
4. U.S. Environmental Protection Agency, July 1976.
5. Water Quality Criteria, California Water Quality Resources Board, Publication No. 3-A, 1963.
6. Water Quality Criteria, Environmental Studies Board, National Academy of Sciences, 1972.
7. Study and Interpretation of the Chemical Characteristics of Natural Water, United States Geological Survey, Water Supply Paper 1473, 1970.
8. Management of Artificial lakes and ponds by Bennet, G.W. 1962. Reinhold Publishing Corporation London.
9. Fisheries Science, its methods and Applications by Rounsefell, G.A and Everhest 1953. John Willey & Sons inc. London.
10. A Survey of Fish industry of river Kunhar by Muslim, M. & Chaudhry, A. 2004. Pakistan Forest Institute, Peshawar, Pakistan.
11. Some Aspects of Morphometric Analysis of Kunhar River watershed by Anwar Masrur, 1973. The Pakistan Journal of Forestry-1973.
12. The Limnology of Lowland Streams in West Malaysia by Ho Sinn Ghye and Jose
13. Furado, 1982. Tropical Ecology, Vol. 23, No.1, 1982.
14. Cold water fish and fisheries in countries of the high mountain arc of Asia (Hindu Kush-Pamir-Karakoram-Himalayas). A review by T. Peter. 27 McLeod

Street, Toowoomba 4350, Australia.

15. Akhtar, N., 1991. The Northern Areas (Pakistan). Fisheries profile, feasible sites for trout culture and an overall sector development perspective. Report for

Project PAK/91/008. Rome, FAO. 29p.

16. Akhtar, N., 1991a. Azad Jammu and Kashmir. Fisheries profile, feasible sites for trout culture and an overall sectoral development perspective. Report for

Project PAK/88/048. Rome, FAO. 25p.

17. Akhtar, N., 1992. Pakistan's cold water fisheries and trout farming sector study:

18. FAO Report of Cold Water fish in Himalayan Region

19. Beveridge, M.C.M. and M.J. Phillips, 1988. Aquaculture in reservoirs. *In*: Proceedings of a Workshop on Reservoir Fishery Management in Asia (S.S. De Silva, ed.): 234-243. IDRC, Ottawa..

20. EIA-Bheri-Babai, 1999. Environment Impact Assessment Stage - 1, Baseline Report of Bheri-Babai Hydroelectric Project. By New Era/Nippon Koei/JICA, December.

21. EIA-Budhi Ganga, 1998. Medium Hydropower Study Project (MHSP) of Budhi Ganga (BG - O) Hydropower Project Vol. 1 & 2. Main Volume by METCON Consultants Pvt. Ltd., November.

22. EIA-Dudh Koshi, 1998. Project Preparation and Studies Directorate, Projects Preparation Department, Medium Hydropower Study Project of Dudh Koshi Hydroelectric Project, NEA. EIA Volumes 1-4, CIWEC. Kathmandu, August

23. trends, opportunities and challenges. Report for FAO/UNDP Projects PAK/88/048 and PAK/91/008. Rome, FAO. 75p.

24. <http://www.fishbase.org/summary/speciessummary.php?id=208>.

25. <http://www.fishbase.org/summary/SpeciesSummary.php?id=9194>.

26. <http://www.fishbase.org/summary/speciessummary.php?id=239>.

27. <http://www.fishbase.org/summary/SpeciesSummary.php?id=82>.

28. <http://www.fishbase.org/summary/speciessummary.p>

Annex-11

Implementation Plan of Social Uplift Plan

Implementation Status & Future Plan of Social Uplift Plan

1- Classification: Bridge across Jhelum River.

a. Description of plan: Permanent Bridge across Jhelum River will connect Lower Chatter Muzaffarabad to Alda village.

b. Expected Date of completion: Sep. 2012

c. Current Status:

Construction was completed in stipulated time during month of September 2012.

Pedestrian access is available but vehicular traffic due to construction activities at power house site and in safety perspective has been restricted for the local villagers.



d. Future Plan: Full time Vehicular traffic access will be allowed to the local community after construction phase.

2- Classification: Link between Sarati Village (KP) to Patrind Village (AJK).

a. Description of Plan:

Construction of structures (Cofferdam & Weir) will provide an access between two villages to the local people.

During the construction phase downstream cofferdam and access roads will be used as temporary access between both sides. After construction activities permanent bridge on weir deck will be used as access route.

(Additional): Installation of pedestrian bridge for Patrind villagers. The villagers used to go across the river by cable trolley but it was washed away by flood in MAY 2005, as part of corporate social contribution, EPCC was built the pedestrian bridge temporarily.

| | | | |
|---|---|--|---|
|  |  |  |  |
| Using Cable Trolley Before 2005 | Cable Trolley was Swept away in 2005 | Pedestrian bridge was built in 2012 | Pedestrian bridge was again built in 2013 |

b. Expected Date of completion: During the whole project period.

c. Current Status:

Currently, road passing through the weir site is being used by the locals as access between AJK & KPK Site.

Downstream cofferdam was constructed in 2013 and has been used as Access Bridge.

(Additional): This pedestrian bridge was used until the downstream Cofferdam was constructed.



Downstream cofferdam was constructed in 2013 and has been used as Access Bridge.

d. Future Plan: As the permanent access route, Spillway Bridge of weir will be installed in October 2016.



Future Plan

3- Classification: Improvement of existing Road.

a. Description of Plan:

As a part of the community development the road from Supreme Court to Children Park will be improved and upgraded where possible with the assistance of DAM (Development Authority Muzaffarabad) and the local Community.

b. Expected Date of completion: During the whole project period.

c. Current Status:

To improve the road conditions for ongoing traffic, EPCC has been maintaining the road regularly using grader and road sprinkler.

EPCC subcontracted to DAM (Development Authority of Muzaffarabad) 3 times for the following work.

- 1st: 18th April 2013: Construction of retaining wall near Awan Block Factory.
- 2nd: 18th April 2013: Construction of retaining wall near Ice Factory.
- 3rd: 25th Sep 2013: Re-Constructing of damaged retaining wall near house.
- EPCC subcontracted on 25 May 2015 to Abbaseen Associates for the rehabilitation of thuri road collapsed area.
- EPCC subcontracted to AJK Developers 3 times for following works:
 - 25th May 2015: Construction of retaining wall near fruit shop.
 - 25th May 2015: Construction of retaining wall near ice factory.
 - 29th Oct 2015: Construction of retaining wall near lala G block Factory.



d. Future Plan:

Major portion of the road has already paved under Muzaffarabad Development Project (MCDP) and rest part of that road will be improved in the same way by EPCC with the finalization of construction activities, until then regular maintenance work will be carried out as and when required.

4- Classification: Construction of new roads.

a. Description of Plan:

New road will be constructed beyond the Children Park located in Lower chatter to the location of the Access Bridge for Powerhouse. The road will be available for physical use by the locals. This will also improve the communication between the local residents of Alda village and Lower Chatter under all contingencies.

b. Expected Date of completion: After the Construction Activities.

e. Current Status:

To improve the road conditions for ongoing traffic, EPCC has been maintaining the road regularly & consistently using grader and road sprinkler.



f. Future Plan: New road will be constructed as the construction activities will be finalized.

5- Classification: Improvement of the sites.

a. Description of Plan:

Improvement of various sites used for different activities during construction or operation period of the Project will be a part of the community development of the local community. The existing state of the land used for different purpose and plan after the construction is given in pictorial form.

b. Expected Date of completion: During the whole project period.

c. Current Status: Ongoing activity.

d. Future Plan: After construction phase site will be rehabilitated as per EMP.

6- Classification: Medical Treatment for Local Residents.

a. Description of Plan:

In case of an emergency, ambulance and medical aid is available and locals can be facilitated.

(Additional): Emergency support case on road side accident (Outside Project).

b. Expected date of completion: During the whole project period.

c. Current Status:

In progress, a doctor and male nurses are placed on sites and local people could be facilitated in emergency and an ambulance is also available for them during any emergency situation.



(Additional): Example/Case: On 24th June 2014, a traffic accident occurred outside the project boundary at weir site that resulted in injuries. EPCC's HSE team provided the first aid and using site ambulance injured person was shifted to Kunhar Christian Hospital where he was admitted for further treatment.(Person belongs to PAPs from adjacent village Sarati).



d. Future Plan: This will be continued during the construction period.

7- Classification: Local Employment.

a. Description of Plan:

Local residents who are residents of AJK or KP especially who are the affected through the Project, will be preferred to the extent practicable and reasonable, to be hired unskilled staff and labor, and skilled staff and labor with appropriate qualifications and experience.

b. Expected date of completion: During the whole project period.

c. Current Status:

In progress, nearly 91% of the total manpower is employed from local communities. (AJ&K: 66.47%, KP: 25.44%).

d. Future Plan:

EPCC will continuously give priority in employment to the unskilled and qualified skills residents.

8- Classification: School Support.

a. Description of plan:

School located at Sarati village (Deedal) will be functional by making of roof, doors, windows and etc. Roof is already completed as below and doors, windows are ready to install. It will enhance circumstance of school and make good relationships with villagers.

b. Expected date of completion: During the construction period.

c. Current Status:

EPCC was installed the entire roof, door and windows in 2003, partial construction carried out by EPCC.







(Additional): Following activities EPCC is conduction to aid schools and residents adjacent to the site:

- TV set has been gifted to residents near the site as goodwill.
- Various sessions on HSE awareness have been held in adjacent schools.
- Community waste is being managed by EPCC as goodwill beyond the contractual obligation.

- Temporary fence in front of school and residential area adjacent to camp of was replaced with CGI fencing and regular maintenance will carried out as and when required.
- Private School courtyard has been protected by EPCC adjacent to camp office.
- Stationary and books were distributed among school children.
- Creating business & job opportunities: Locals from adjacent villages have established small business such as shops and canteens, as the EPCC is now paying in cash for food so small cafeterias & canteens (in total : 4ea) have been established with in the project vicinity on both sites.

d. Future Plan: This will be continued during the construction period.

| | | |
|---|---|--|
|  |  |  |
| <p align="center">School located at Sarati village (Deedal) is completed and working</p> | | |
|  |  |  |
| <p align="center">TV set has been gifted to residents near the site as goodwill</p> | <p align="center">Stationary and books were distributed among school children's.</p> | <p align="center">Various sessions on HSE awareness have been held in adjacent schools.</p> |

| | | |
|---|---|--|
|  |  |  |
| Community waste is being managed by EPCC as goodwill beyond the contractual obligation. | Temporary fence in front of school and residential area adjacent to camp. | Private School courtyard has been protected by EPCC adjacent to camp office. |
|  |  |  |
| Economic Activities/ Source of indirect employment | | |

9- Classification: Improvement of water supply.

a. Description of Plan:

- Developed and used water supply facilities for construction site will be transferred to local community after construction activities.



- **(Water Supply –Weir Site):** Water supply to the Sarati village after developing and using the well for the construction camp.
- **(Water Supply –Weir Site):** Water supply to the Park area after developing and using the water tanks at the access road of disposal area.
- **(Water Supply –Weir Site):** Connection of water pipe line to the water tank at Sarati village.
- **(Water Supply –Weir Site):** Installation of surface drainage line at Sarati village.
- **(Water Supply- Power House):** Water supply to the Lower Chatter villagers after developing and using the well for the main camp.
- **(Water Supply- Power House):** Water supply to the local residents after developing and using the well for batching plant.
- **(Additional):** Construction of water tank at water source located above Alda village.
- **(Additional):** Water supply to Patrind & Tarcheela village after developing well near Patrind village.
- **(Additional):** Repairing water tank at Sarati village with proper top covering.

b. **Expected date of completion:** During the construction period.

c. **Current Status:**

- **(Water Supply –Weir Site):** Water resistivity survey was carried out but no ground water was found. Development of the alternative sources is under plan instead of original planned place/activity.
- **(Water Supply –Weir Site):** Water tanks were developed at Sarati and Dalola village in September 2013 and these are currently in use.
- **(Water Supply –Weir Site):** Water pipe line was developed from

existing water tank to Sarati village in 2013.

- GI pipe(D50mm) : 230m
- Installation of fence and protection wall for water source were installed and access road was also repaired.
- **(Water Supply –Weir Site):** Surface drainage line was developed at Sarati village in 2013.
 - RCC pipe(D450mm) : 87m
 - 3 Manholes and block masonry.
- **(Water Supply –Power House Site):** Development of the well near camp office in old thuri park has been developed and it's operational.
 - This well is being used to supply water to CNEEC and Kyung dong workers who will be engaged in Powerhouse construction during construction period.
- **(Water Supply –Power House Site):** The tube well for batching plant has been developed and it is currently in use.
- **(Water Supply –Power House Site):** Construction of water tank at water source located above Alda village has already been agreed by EPCC but due to internal conflict among locals scheme has yet not been started.
 - Water tank (3m×3m)
 - PVC Pipe line : 1,500m
- **(Water Supply –Weir Site) [Additionally]:** Water Resistivity survey was undertaken but ground water could not be found, therefore alternative options would be carried out with the consent of locals.
- **(Water Supply –Weir Site) [Additionally]:** Water tank prepared by EPCC for Sarati village was repaired and has been made dirt free
 - Top cover is installed surrounded by a concrete protection wall.
- **(Water Supply –Weir Site) [Additionally]:** Pathway towards adjacent spring was constructed to facilitate local's access to the water source.

| | | |
|---|--|---|
|  |  |  |
| Water supply to the Park area at the access road of disposal area. | Water tanks at Sarati and Dalola | Connection of water pipe line to the water tank at Sarati village. |
|  |  |  |
| Water pipe line from existing water tank to Sarati village in 2013. | Installation of surface drainage line at Sarati village | Surface drainage line developed at Sarati village in 2013. |
|  |  |  |
| Surface drainage line was completed in 2013. | Well near camp office | The tube well for batching plant. |
|  |  |  |
| The tube well for batching plant has been developed and it is currently in use. | Water tank prepared by EPCC for Sarati village was repaired and has been made dirt free. | Pathway towards adjacent spring was constructed to facilitate local's access to the water source. |

- d. **Future Plan:** All the development i.e. water wells etc. will be transferred to local community with the finalization of construction activities.
- Regarding construction of water tank at water source located above Alda village will be executed with consent of locals from Alda and be used, for this conflict EPCC already written to local administration to resolve the internal conflicts.
 - Water Resistivity survey was undertaken but ground water could not be found, therefore, alternative options would be considered with consent of locals with finalization of construction activities.

10- Classification: Improvement of area after completion of construction.

a. Description of plan:

During the construction period, Project area will be actively used for stocks, temporary buildings, equipment storage and other various activities. Those areas will be changed to the park, playground etc. after construction work, and specific status of construction work on concerned area will be satisfactory to local people and their community.






b. Expected date of completion: After Construction Activities.

c. Current Status:


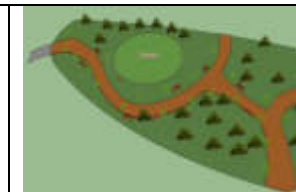

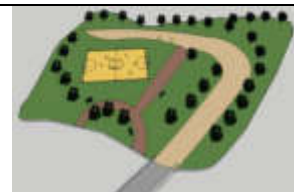
- **(KP-Camp):** Construction camp at weir site was constructed in September 2013 and it is currently in use, however due to weir-site layout change, some of this area should be excavated and disappeared.
- **(KP-Disposal Area):** Still in use as disposal area.

- **(AJ&K -M&E Camp, Fabrication Yard):** M&E camp and fabrication yard at powerhouse site has been completed and it's in use.
- **(AJ&K – Batching Plant Yard):** Batching plant yard was developed in 2013 and concrete production is in progress after installation of batching plant.

| | | | |
|---|---|--|---|
|  |  |  |  |
| Construction camp at weir site | KP-Disposal Area | M&E camp and fabrication yard | Batching plant yard |

d. Future Plan:

- **(KP-Camp):** The remaining area will be developed considering the given conditions after construction activities. An outdoor observation deck and resting place will be the best option available.
- **(KP-Disposal Area):** This will be changed into cricket field & park after construction activities and will be transferred to the local communities.
- **(AJ&K -M&E Camp, Fabrication Yard):** This will be changed into cricket field & park after construction activities and will be transferred to the local communities.
- **(AJ&K – Batching Plant Yard):** This will be changed into football pitch for recreation & Park after construction activities and will be transferred to the local communities.

| | | | |
|---|---|--|---|
|  |  |  |  |
| Construction camp at weir site | KP-Disposal Area | M&E camp and fabrication yard | Batching plant yard |

11- Classification: Embank protection.

a. Description of plan:

- Slope protection and embankment against the risk of encroachment

and inundation during heavy rainy season

- Rip-rap protection
- Gabion protection.

b. **Expected date of completion:** After Construction Activities.

c. **Current Status:**

- Permanent protection measure with concrete works have been taken (Up & downstream the access bridge) along the river bank at batching plant area and M&E fabrication workshop area.
- Same measures have been undertaken on power house site in front of O&M building and powerhouse structure site.

d. **Future Plan:**

- This has been completed on power house site on left and right banks of river.

| | | |
|---|--|---|
|  |  |  |
| <p>After Construction</p> | <p>In front of batching plant</p> | <p>In front of M&E fabrication yard.</p> |

Annex-12

Complaint Register

Environmental & Social Monitoring Report (Jan-Mar 2015)

| LOG NO. | Complain Date | Name (Complaint Person) & Job Title (KungDong) | Description | Location | Status | Correction Date | | Correction Verified | |
|---------|---------------|--|--|------------|--------|-----------------|---------------|---------------------|-----|
| | | | | | | Req'd | Act. | EPCC | OE |
| 01 | 23-Feb-2016 | Shafiq Dar (CNEEC Labor) | CNEEC labor was working in M&E workshop and he is welder helper. He asked for gloves from his supervisor but in return he was forced and asked to leave the company or work without PPES. EPCC has taken corrective action and asked the Chinese management to provide proper PPEs and don't do this again with any labor. | Powerhouse | Close | 23-Feb-2016 | 26-Feb-2016 | YES | YES |
| 02 | 15-March-2016 | Faheem Ahmed Awan (Local Community Member) | Member living nearby project area complaint about the labors that whenever they are passing near to his house they loudly talk with each other and he also said that most of the labors see into the house when they are passing so privacy is effected by them. EPCC has taken corrective action and told labors during every tool box talk for 3 days to take care of the privacy. EPCC has provided them with 60 meter Green net to cover the front of their house in order to take care of privacy | Powerhouse | Close | 15-March-16 | 19-March-2016 | YES | YES |