



Environmental & Social Monitoring Report (January to March 2014)

Project Number: 44914

PAK: Patrind Hydropower Project

Prepared by Star Hydro Power Limited

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Asian Development Bank



STAR HYDROPOWER LIMITED

147 MW PATRIND HYDRO POWER PROJECT

ENVIRONMENTAL & SOCIAL MONITORING REPORT

(JANUARY-MARCH 2014)



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A COMPANY OF KOREA WATER RESOURCES CORPORATION

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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 Labour 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 Social Plans) 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 2014 the physical progress achieved is 32.14%.

i. Location of project

Village Patrind, District Muzaffarabad, Azad Jammu and Kashmir

ii. Nature

Run of river Hydropower Project.

iii. Scale/size

147 MW

iv. Date of construction/operation commencement

Preliminary works commencement: September 2011

Main works start after issuance of NTP: December 2012

v. 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: No Hyuk Park 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 report has been submitted to EPA AJ&K
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 are 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, Sarati and Shoran) are being employed and for skilled jobs they are being hired on priority basis as per the requirement and the qualification. 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.	Being complied in letter and spirit. Various measures have been undertaken in this regard such as provision of PPEs, education sessions, availability of medical facilities, installation of sign boards and close supervision by EPCC & OE HSE staff. Monitoring of flora and fish fauna have 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.	Being complied in letter and spirit. Selection of batching plant and dumping locations has been finalized in consultation with EPA-AJ&K. Quality monitoring reports are being sent to EPA.
Communicate any change in the approved project to AJK-EPA and that would be commenced after obtaining the approval. The approval shall stand null	Shall be done if required.

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 maybe required and can be withdrawn at any time with any prior notice if deem necessary in the public interest.

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 from765m.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 Company has fulfilled the condition as 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	<p>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.</p> <p>The roads near the project area are being maintained by the EPC contractor.</p>
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 has been obtained from EPA KP for installation of batching plant 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

A consistent site monitoring by OE’s HSE staff has been carried out during quarter and incidents of violations and non-compliances by EPCC and its sub-contractors were regularly recorded and reported in daily, weekly and monthly reports. HSE records and reporting have been improved. Remedial actions were undertaken to mitigate impacts and hazards of the incidents and violations from safety procedures. Non Conformity Reports, letters and site notes were issued by the OE for non-compliances and suggested corrective measures have been implemented by EPCC. Instructions made by OE, SHPL and Lenders have been followed by EPCC. Correspondence with OE and non-compliances is given in the table below;

Letters/Site Notes & Non Conformity Reports (NCR) issued by Owners Engineer during Quarter

Correspondence with Owner Engineer

Sr. #	Type	Date	Ref	Subject	Date	Ref Patrind-	Corrective action taken
1.	Letter	9/01/2014	LET/PES.ST-EPCC/277	MOU for municipal collection of project generated waste	09/03/2014	14-161	Only doable changes in MOU format, however, EPCC has tried its best for inclusion of OE's recommendations. Also, a draft plan for installation of portable washrooms was submitted to OE for approval. Trench made at lower site was closed and a large size collection bin is placed at main collection point. Other relevant information regarding waste management was provided.
2.	Site Note	22/01/2014	40	Dust Prevention measures powerhouse site	06/02/2014	14-085	Water was sprinkled using water browser. The raw material supplier was warned to cover with plastic sheeting/or cloth requirement during transportation. The raw material in stock yard was covered with suitable cloth/sheet
3.	Site Note	22/01/2014	41	Removal/ replacement of obstructive sheeting on the access road for better visibility	30/01/2014	14-076	Corrugated iron sheets from last two panels at junction of Project Access Road and Lower Chatter Road were replaced by wire mesh fence to enhance the visibility and to mitigate the risk factors.
4.	NCR	22/01/2014	18	HTV/LTV cables crossing the area	28/01/2014	14-070	One million rupees paid to WAPDA for removal of cables as soon as possible. The sequence of the process of Shifting HTV /LTV lines sent to OE. Now NCR is Closed on 27 April 2014 after reporting period.
5.	Site Note	23/01/2014	42	Cleaning of access roads in powerhouse area	26/01/2014	14-060	Mud has been removed. Grader is mobilized at site to maintain the access roads. Water browser is being used to Prevent dust issues.
6.	Letter	23/01/2014	LET/PES.ST-EPCC/286	Resubmission of reports for the excavator and Shotcrete machine incidents (follow up letter)	01/04/2014	14-226	The reports for the excavator and shotcrete machine incidents were resubmitted after revision.
7.	NCR	28/01/2014	19	New Batching Plant	10/03/2014	14-160	A full time HSE Inspector (Mr. Waqas) was deputed on site for consistent monitoring of hazards and risks. Furthermore, Indicated iron bars/ H beams were appropriately barricaded and steel posts were relocated to mitigate risk and to safeguard project personnel. Now NCR is Closed on

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Correspondence with Owner Engineer

Sr. #	Type	Date	Ref	Subject	Date	Ref Patrind-	Corrective action taken
							27 April 2014 after reporting period.
8.	Site Note	29/01/2014	43	Lack of PPEs at powerhouse site	03/02/2014	14-079	EPCC provided all equipment to sub-contractors and again handed over PPEs to ZK Associates HSE officer (Mr. Daniyal Qureshi). Furthermore, a training session was arranged at ZK site and office.
9.	Letter	7/02/2014	LET/PES.ST-EPCC/311	HSE Site Audit Report	-	-	Corrective actions undertaken are detailed in section D of report and were subsequently inspected by OE's HSE staff.
10.	Letter	14/02/2014	LET/PES.ST-EPCC/312	Comments on EPCC Environmental and Social Monitoring Report (Fourth Quarter 2013)	-	-	Comments and explanations have been included and addressed in the current report. However separate response may also be sent by EPCC.
11.	Letter	5/03/2014	LET/PES.ST-EPCC/339	OE Comments on the Environmental & Social Annual Monitoring Report	11/04/2014	14-251	The revised copy of Environmental & Social Annual Monitoring Report submitted for further review.
12.	Letter	11/03/2014	LET/PES.ST-EPCC/349	Plan for Dismantling of Old Batching Plant	-	-	Initially a dismantling plan for old batching plant removal from workshop area was submitted to OE vide No. Patrind -14-147 for information and in response EPCC received letter with recommendations to be followed in future which will be followed accordingly.
13.	Letter	11/03/2014	LET/PES.ST-EPCC/345	Weir Site-Flood Emergency Evacuation Plan (Rev.01)	17/03/2014	14-184	In flood emergency situation, the coordination with the local administration will also be made. Their contact details submitted. The intercoms are installed in HRT and are working properly. Loud hailer are available at site and installation of warning lights on the vehicles is in progress. Contact detail of personnel designated to inform HRT staff submitted. A siren is already installed near HRT and planning to install inside the tunnel. One evacuation drill has already been undertaken. However, more training sessions will be held periodically to aware the site staff.

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Correspondence with Owner Engineer

Sr. #	Type	Date	Ref	Subject	Date	Ref Patrind-	Corrective action taken
14.	NCR	12/03/2014	20	Access road surge shaft	13/03/2014	14-167	High beam flood lights were installed to enhance the illumination status at the critical sections of access road. Currently a signal man is placed near land sliding area near HRT. Furthermore, HSE team has been instructed that during rainfall, ensure presence of signalmen (day/night) to manage workers and equipment movement on surge shaft access road. An experienced HSE Assistant Engineer has additionally been deputed on night shift commencing from 14th March 2014. HSE revised Organizational Chart showing staff placement on day-night shifts submitted. NCR closed on 27 th March 2014.
15.	Letter	15/03/2014	LET/PES.ST-EPCC/351	Drinking Water Quality Monitoring Reports	17/03/2014	14-179	All management, staff and workers were informed about quality tests results and recommended precautionary measures. Cleaning of water tank prepared for Sarati village has periodically been undertaken and has been treated with alum and chlorine. Similarly water tank lower site is being cleaned/treated even use of water is not for drinking purpose. Well water adjacent to camp office is owned by a local resident and is not in use for drinking purpose by locals or camp office staff. Monthly, more than 1000 mineral water (19 liter) bottles are being provided for drinking purpose. Education/awareness about clean water and water borne diseases has been communicated at all levels through tool box talks, trainings and on site sessions. Procedure to carry out for EMP monitoring activities has been finalized and required activities started in next two weeks.
16.	Letter	16/03/2014	LET/PES.ST-EPCC/356	proposed design for soakage pits and layout plan for installation of portable toilets at p/h site	-	-	Design approved by OE and installation of portable washrooms and construction of soakage pits as per approved design is near to complete. A completion report will be submitted in response.
17.	Letter	22/03/2014	LET/PES.ST-EPCC/361	Drinking Water Quality Reports	25/03/2014	14-205	As follow up of decisions made during coordination meeting held on 17 th March 2014 with regard to HSE issues, the EPCC engaged a local based NGO (Edinburgh Direct Aid) having relevant professional expertise to conduct environmental monitoring activities as stipulated in EMP (table

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Correspondence with Owner Engineer

Sr. #	Type	Date	Ref	Subject	Date	Ref Patrind-	Corrective action taken
							6.1). Drinking water samples from all sources available in project vicinity have been collected in presence of OE's HSE staff during field visits undertaken on 22 & 23 March 2014). Furthermore, quarterly monitoring of fish fauna and flora has also been undertaken during the field visits. Lab analysis results of collected samples and reports on fish fauna /flora will be submitted.
18.	Letter	22/03/2014	LET/PES.ST-EPCC/362	100 kVA overhead line crossing the Botching Plant Area (NCR-18 and 19)	11/04/2014	14-252	As per OEs recommendations, relocation of 100KVA lines, the final remedial measure has also been taken. NCR Closed on 27 th April 2014.
19.	NCR	24/03/2014	22	Kyung dong's unsafe Explosive Storage at weir site	-	-	Immediate corrective measures such as separate placement of explosive and detonators have been undertaken. Placement security shelters and has been done .But OE wants heat proof storage which will be made as soon as possible using soft gabion cover. NCR still Open.
20.	Letter	25/03/2014	LET/PES.ST-EPCC/368	MOU for Municipal Collection of Project Waste	5/04/2014	14-233	As follow up action EPCC's HSE team conducted the visit of MCM's final disposal site at Zaminabad Sahdara on 27 th March 2014 (Visit Note attached).Subsequently, on 1st April 2014, MCM office has also been visited to obtain further record and information with regard to disposal facility and methodology (relevant documents submitted).
21.	Letter	28/03/2014	LET/PES.ST-EPCC/375	M&E Works and batching plant HSE manual submissions	-	-	Submission of Operation Manual for Newly Installed Batching Plants And M&E Health & Safety Plan has already been undertaken vide letter Patrind 14-206, however addition required documents are still to be sent

Unsafe Act & Unsafe Condition:

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. However, expected outcomes were not obtained as a limited observations received during previous quarters. OE remained unconvinced with said mechanism and suggested to improve or use alternative methods to get feedback.

Therefore, in order to get maximum feedback from project employees the best observer award system was introduced to encourage employees for making observations. The best observer award (Amounting Rs.10, 000/=) has been given to each selected observer for last two months. In total, 40 UA/UC cards were received after this inducement during reporting quarter (Annex-1). Other alternatives of monitoring have also been used to get feedback from employee e.g. daily safety manager report received from all section consecutively

Fig: Notice for UA/UC Observers

10,000PKR

X 10

ENTER THE BEST SUGGESTION THROUGH UA/UC CARD AND WIN

یواے ایوسی کارڈ کے ذریعے بہترین رائے دیں اور جیتیں

UA/UC 카드를 작성하시면 우수한 제안을 한분에 대해 포상합니다

Last Date for the submission of card is Feb28, 2014

DAEWOO E&C PAKISTAN PATRIND HYDROPOWER PROJECT
DAEWOO CAMP OFFICE LOWER CHATTER OPPOSITE THURI PARK MUZAFFARABAD AZAD JAMMU & KASHMIR

Warning Letters for Non-Compliances:

HSE staff work in day and night shifts to check non-compliance and violations of HSE. HSE violations are identified and depending on severity of violation warning is given to the offender. Verbal warning is given for the first time on minor violations. If any employee fails to abide by HSE policies after verbal warning he is given a written warning letter. 25 warning letters were issued for incident for violations of HSE procedures. List of warning letter is given in the table below. As per EPCC's standard procedure, after three warnings employee would not be able to continue its job. However before removal it is important to ensure that individual has been informed / trained and provided with the necessary equipment. Depending on nature of non-compliance warnings are given but in common practice individuals are warned verbally first.

WARNING LETTERS

Sr. #	Issued to	Date	Designation	Company	Location	Reasons
1.	Arsalan	02/02/2014	Mechanic	Sungbo C&E	Weir Site	Smoking near the generator
2.	Tariq Mehmood	02/02/2014	Batching Plant Operator	Daewoo E&C	Weir Site	Working without permission
3.	Tariq Mehmood	02/03/2014	Batching Plant Operator	Daewoo E&C	Weir Site	Working without permit
4.	Muhammad Bilal	07/01/2014	Bore Master	ZK Associates	P/H Site	1. Unsafe Behavior 2. Using Faulty Tools 3. Refusal to Show ID Card
5.	Abdul Hameed	08/03/2014	Mechanic	Daewoo E&C	Weir Site	Misbehavior
6.	Zia ur Rehman	13/01/2014	Dump Truck Helper	Sungbo C&E	Weir Site	Operating without authorization
7.	Muhammad Javed	13/01/2014	Generator Mechanic	Sungbo C&E	Weir Site	Unsafe behavior
8.	S. Haseeb	13/03/2014	Excavator Operator	Daewoo E&C	Weir Site	Operating without inspection
9.	Ameer Zada	15/03/2014	Dump Truck Driver	Kyung dong	Weir Site	Not following the HSE rules and regulations
10.	Ameer Zada	15/02/2014	Dump Truck Driver	Kyung dong	Weir Site	Working without safety shoes
11.	M. Rashid	19/03/2014	Jumbo Operator	Kyung dong	Weir Site	Working without high-vis jacket
12.	Sultan	20/02/2014	Nozzle Man	Sungbo C&E	Weir Site	Working without safety Helmet
13.	Manzoor Hussain	24/01/2014	TM Driver	Daewoo E&C	P/H Site	Unsafe Behavior

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Sr. #	Issued to	Date	Designation	Company	Location	Reasons
14.	Ameer Gul	25/01/2014	Excavator Operator	ZK Associates	P/H Site	1. Unsafe Behavior 2. Using Faulty Tools
15.	Allah Dita	25/01/2014	Bore Machine Helper	ZK Associates	P/H Site	1. Unsafe Behavior 2. Using Faulty Tools
16.	Mahboob	26/02/2014	Labor	Kyung dong	Weir Site	Working without safety shoes
17.	Abdul Basit	25/03/2014	Transit Mixer Helper	Daewoo E&C	Weir Site	Working without high-vis jacket
18.	Aamir Bashir	25/03/2014	Lab. Assistant	Daewoo E&C	Weir Site	Working without high-vis jacket
19.	Mahboob	26/03/2014	Labor	Kyung dong	Weir Site	Not following the HSE rules and regulations
20.	Ahmed Iqbal	26/03/2014	Helper	Daewoo E&C	P/H Site	1. Unsafe behavior 2. Operating without authorization
21.	Naveed Zaibi	26/03/2014	Supervisor	Daewoo E&C	P/H Site	1. Fall Protection Violation 2. Unsafe behavior 3. Failure to supervise 4. Operating without authorization
22.	Bilawal	26/03/2014	Helper	Daewoo E&C	P/H Site	1. Fall Protection Violation 2. Unsafe behavior 3. Operating without authorization
23.	Mukhtar	27/03/2014	Lifter Operator	Sungbo C&E	Weir Site	Not following the lifting procedure
24.	Zubair	28/03/2014	Dump Truck Operator	Kyung dong	Weir Site	Working without mask and safety helmet
25.	Israr Hussain	30/01/2014	Lab Assistant	Daewoo E&C	P/H Site	1. Unsafe Behavior 2. Others (Refused to follow HSE rules and misbehaved with HSE staff)

D. Incidents of Environmental and Safety Accidents

a) Environmental Accidents and Mitigation

- During the reporting period environmental incidents such as minor soil contamination were observed due to inappropriate handling of oil, dust on access roads due to vehicles movement, HRT waste water sedimentation tanks overtopping due to delayed cleaning and gaseous concentration in HRT. Preventive and remedial actions were undertaken and warnings were issued to violators. Irregularities in waste segregation were observed; however, overall waste collection mechanism has been improved.
- OE raised concerns over waste disposal site managed by MCM and MOU with Municipal Corporation Muzaffarabad to dispose the Project's waste in their landfill site as final disposal of waste. OE's concerns were in relation to final disposal of non-recyclable wastes to meet international environmental standards as the contractor is responsible for all waste until its ultimate disposal, whether it is being handled by the municipality or otherwise. Waste segregation at source before municipal collection into recyclables, non-recyclables, hazardous, organic etc. To address OE's concerns a site visit was conducted by EPCC and report was submitted to OE as well (Annex-7).
- After demolition of washrooms near Access Bridge, no facility was available for powerhouse site workers during quarter. Now installation of portable washrooms with appropriate septic tank and soakage pits is in progress with consultation of OE.
- The excavated material is being transferred to the disposal area at upper site but no embankment has been constructed to protect spoil erosion due to rise in river water or flood. Whereas, at lower site it is being dumped on approved site near bridge and is being used in civil works. As illustrated in excavated material management plan the material is being dumped and used to reclaim the land and preventing serious waste problem.

- Gaseous concentration (CO, H₂S, LEL, and O₂) in adit and headrace tunnel is being monitored on daily basis using gas detector. Monitoring of CO₂, N₂O, NO₂ and dust has also been undertaken in compliance with (K-C-15.1.7B)
- Fish and Flora studies were conducted during the quarter in March to check the environmental impact of the Project activities on River Kunhar fishes and surrounding flora of both sides.
- Slope stability studies have partially been undertaken during the quarter.
- Environmental monitoring was undertaken during the quarter in which samples from all the fresh water sources, river water and the camp office's sewerage waste water was collected for water quality tests. Results of all these activities have been shared with OE and SHPL.

b) Health and Safety Accidents and Mitigation

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:

- New safety sign board's installation (More than 100 small and large size)
- Regular trainings/education sessions for staff and labor
- Waste management system plan design initiative
- Placement of more first aid boxes on site
- Replacement of telephone in tunnel of longer range
- convex mirrors, sound and light detector procurement
- CCTV installation for close supervision
- Fire alarm system in progress

Injuries treated using first aid boxes are reported through daily HSE reports & site HSE staff and record of boxes is maintained by HSE clinical staff. During quarter ambulances were randomly inspected by OE and corrective actions were undertaken as recommended. HSE clinical staff is responsible to inspect first aid boxes and other facilities and these inspections have been made randomly.

Table: First aid boxes placement

(Lower site)	(Upper site)
Old batching plant (Daewoo)	New batching plant
Lathe machine (kyung dong)	Old batching plant
Kyung dong workshop	Coffer Dam
New batching plant	HRT
Power house	Korean mess
Explosive store	Pakistani mess
HRT	

As per OE's direction during installation of batching plant at upper site relocation of high voltage power lines was done through concerned government department.

Similar to previous quarters, to manage and mitigate health and safety incidents RPN (Risk Priority Number) calculator has been used to assess the severity and likelihood of risk of accidents/incidents. Incidents recording extend to all workers/staff working for sub-contractors and on rented vehicles/machinery. The summary of accidents/incidents encountered during the reporting period is given in below mentioned table. No media reaction with regard to these incidents has been received during quarter:

Incident	Frequency	Description	Media or Community Reaction
Fatality	Nil	Nil	None
First Aid Case	2	<ol style="list-style-type: none">On 29th January 2014, drain holes grouting work was under execution on surge shaft access road. The involved person (Mr. Noman) was working as helper on grouting machine loaded in P.T truck equipment and it was a routine activity. Suddenly grout machine stopped while he was stirring the stuck material, the machine started and due to vibration he lost his balance and fell down from four feet height. He was sent to the hospital in site ambulance accompanied by HSE Doctor & HSE Manager for further examination and treatment. No fracture or major injury occurred.At 10:30 am Mr. Wasim Abbasi owner/ operator of a rental excavator was loading his personal excavator machine on the trailer which was	None

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Incident	Frequency	Description	Media or Community Reaction
		released by Sub-Contractor and rental contract was terminated by Sub-contractor Company 15 days earlier. He loaded excavator on the bed of trailer successfully in safe manner. His next plan was to shift excavator bucket on the trailer bed as well, while handling the bucket of excavator suddenly his feet slipped on ground and his arm struck with bucket and as result he got the bruise on his left arm. On site HSE team and nurse arrived at the scene immediately with ambulance, after initial examination the injured person was shifted to CMH Muzaffarabad for further checkup. Medical specialist checked his X-Ray reports and found clear so medicine was given to him and he was discharged and went to his home on same date. HSE Doctor also visited CMH to know his condition and reported that he is safe and has got only scratch on elbow.	
Near Miss	2	<ol style="list-style-type: none"> 1. On 27th January 2014 during placement of polythene sheets near surge shaft slopes a stone roll down to the access road where a worker escaped hardly by inches. All the workers on site were gathered for education with regard to hazard assessment and preventive measures. 2. On 22nd February 2014, on Powerhouse Site at 14:30, the gabion wall between sections 308-318 from elevation 654m-658m collapsed due to sudden pump pressure. Luckily no worker was in same section, therefore, all labors remained safe. Consequently the pouring work was immediately stopped and collapsed area of wall was cordoned off with warning tape. 	None
Property damage Environmental incident	1	Minor soil contamination due to inappropriate handling of oil, dust on access roads due to vehicles movement, HRT waste water sedimentation tanks overtopping due to delayed cleaning, gaseous concentration in HRT and camp site sewerage out flow in river without soakage pit which is now under plan to be constructed. Mitigation measures are being undertaken as per OE's directions but partial compliance has been observed on part of EPCC.	None

Safety Milestone

First safety milestone was achieved by EPCC in November 2013 when one Million safe man hours were completed. About 1.7 Million Safe man hours have been completed till December 31, 2013 without any Loss Time Injury (LTI) / fatality.

External Monitoring /Inspection

Site HSE internal inspection by EPCC has remained an ongoing activity. External monitoring has periodically been carried out by SHPL and frequently by OE (PES).

Internal Inspections Conducted During Reporting Period

To mitigate safety incidents, equipment and electrical appliances are being inspected to ensure fitness through color coding system. Sample checklists are attached as **(Annex-2)**. 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 as well as on the health of labor working on sites and for proper maintenance of machinery and other equipment regularly. Following inspections have been consistently undertaken by EPCC during the reporting quarter:

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

Permit To work (PTW):

For the following activities have been issued during the quarter

1. Welding/ Open Flame Work Permit
2. Blast Permit
3. Confined Space Entry Permit



HSE Audit by OE:

OE conducted HSE audit of lower site during month of February, to check HSE conditions on site. The summarized report is tabulated below:

Sr.	Issues identified by Owner Engineer during Audit	Corrective measures taken by Engineering Procurement & Construction Contractor
1.	Risk of fire	Quotations received for Fire Alarm system installment. It will be installed soon.
2.	Mishandling of electrical cords and panels	Insulation of electric cables and proper placement has been done
3.	Work at height and elevated locations	Construction team of contractor and sub-contractor was told to use scaffoldings and proper working platforms
4.	Working surfaces	Working platform was installed for working at heights
5.	Pathways, ramps, ladders, planks and working surface controls	Partial improvement has been done
6.	Open light lamps	Light cover is installed on standing light
7.	Housekeeping in HRT	Housekeeping has been improved in HRT tunnel on upper site
8.	Noisy ventilator	Noise insulation was done on outside ventilator
9.	Workers using river water	All instructors were instructed not to use river water and river housekeeping was improved
10.	Fence not installed on sites of road	Barricading has been done along road side
11.	Used water must be removed from old batching plant	All the sedimentations were removed and disposed in excavated waste disposal area as recommended by OE HSE staff
12.	Unsafe ladder	Proper handrails were installed on Ladders

13.	Improper placement of fire extinguishers	Fire extinguishers were placed in location recommended by OE HSE Staff
14.	Trash not removed from workshop	Trash was removed from the workshop
15.	Blocking not used under outriggers	Information was disseminated to administration to take action
16.	Gas cylinders not placed properly on workshop	Stands were made and cylinders were placed in stands
17.	Fire extinguisher not installed near fuel dispenser	Fire extinguishers were installed near fuel dispenser
18.	Working without noise protective equipment	Ear muffs have been distributed to labor associated with high noise activities
19.	Improper safety sign boards at explosive area storage	Proper safety signs boards have been installed at site
20.	Accumulated Sludge in HRT	HRT sludge regularly monitored and cleaned when required

HSE Internal Audit:

HSE annual audit was conducted during the month by of the Daewoo Head Office Corporate HSE Team. A review of workplace HSE management system was conducted on 12-13 March to determine the level of HSE performance. An overall rating has been calculated by applying a numerical score to each rating. EPCC HSE performance was determined as 70 % which is more than satisfactory.

E. Labor Relations and Conditions

(i) Nature of labor dispute or grievance

During the reporting quarter no incident of labor dispute was observed, recorded and reported.

(ii) Legal requirements, Permit conditions and renewal requirements

Requirements related to labor's contracts, permits and other conditions remained constant and no change was observed during last three months. Daily wage was enhanced by sub-contractor Kyung Dong Company from Rs.465/= to Rs.537/ (Local market rate is approx.Rs.400/= per day). The EPCC and its sub-contractors are paying according to the labor law. Daily additional 2 hours¹ are being paid as normal hourly rate. But monthly 32 hours are fully paid without work. EPCC and its sub-contractors are also paying (normal hourly rate x 2) for work on holidays. Rest

¹ Additional hours means despite of 2 hours break during the weekdays and 3 hours on Friday during the work shift the contractor is paying full at normal rate

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

(iii) Authorities in charge of investigation/recording

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

To address any dispute or work related complaint received from staff /workers. An internal Grievance Redress Committee (GRC) has also been established with following composition:

Planning Manager	(Korean)
Admin Manager	(Local)
HSE Manager	(Local)

Committee is mandated to investigate the matter in an unbiased manner and resolve it amicably so that the concerned party or individual is satisfied and a friendly / peaceful environment is reinstated at project site. During the quarter no dispute was recorded and no complaint received by the committee.

(iv) Media or community reactions (if any)

No reaction was observed from media or the community.

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

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

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

120 staff/workers have been accommodated in the base camp at powerhouse site. Additionally three private houses were leased/ rented to accommodate increased man power. However, as majority of workers are local residents so they do not need accommodation. 150 workers have been provided accommodation at weir site. Buildings hired for rent have been evacuated in better condition. The living conditions are up to merit with all necessities.

Standards for labor health and safety are consistent with IFC's Environmental, Health and Safety General Guidelines. These are executed according to Provision 6.7 Health and Safety of EPC Construction Contract.

The EPC contractor:

- Made all reasonable precautions to maintain the health and safety of the Personnel. First aid facilities are available at all times at the sites and at any accommodation.

- HSE Department is responsible for maintaining safety and protection against accidents.
- Maintained records and make reports concerning health, safety and welfare of labour staff.

(vii) 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 SHPL and EPC contractor those have been made in light of National and International laws and standards, implementation during the quarter has been observed accordingly:

CONTRACTUAL TERMS/ CONDITIONS	STATUS OF COMPLIANCE DURING QUARTER
ENGAGEMENT OF STAFF AND LABOUR	
Except as otherwise stated in the Project Requirements, the Contractor shall make arrangements for the engagement of all staff and labour, <u>local (People living in project vicinity)</u> or otherwise, and for their payment, housing, feeding and transport.	EPC contractor has made all necessary arrangements for the engagement of all staff and labour and payment for their wages/ salaries, housing, feeding and transport. However, the local staff/workers do not need housing in the project base camp.
(i) The Contractor and its subcontractor(s) shall prefer, to the extent practicable and reasonable, to hire unskilled staff and labour, and skilled staff and labour with appropriate qualifications and experience, who are residents of AJ&K or KP especially who are the affected of the Project.	More than 150 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.
(ii)The Contractor shall, and shall ensure that its subcontractors shall, fulfil and observe the Environmental and Social Requirements in relation to the engagement of staff and labour.	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 undertaken accordingly.
RATES OF WAGES AND CONDITIONS OF LABOUR	
The Contractor shall pay rates of wages, and observe conditions of labour, 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	The pay rates of wages are comparatively better than the local prevailing rates. Temporary skilled workers = Rs. 700-800/day .Temporary unskilled workers= Rs. 500-550/day whereas in local market it ranges from 600-700/day and 400-450/day respectively. These rates are applicable to workers employed by contractors and subcontractors in compliance with EPC Contract.

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conditions observed locally by employers whose trade or industry is similar to that of the Contractor.	Minimum salary as per local labor law was 7,000 per month till 30th June 2013 which has been increased up to 9,000/- per month. While in the project the minimum salary for the permanent worker is 13,000/-.
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PERSONS IN THE SERVICE OF OTHERS

The Contractor shall not recruit, or attempt to recruit, staff and labour from amongst the Employer's Personnel.	Full compliance of the condition was observed during entire quarter.
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LABOUR LAWS

The Contractor shall comply with all the relevant labour Laws applicable to then 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 Labour Standards; therefore, compliance with local standards is same with international laws /standards. Furthermore, Pakistan has ratified ILO's conventions on core labour 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 labour 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	Compliant boxes are placed on each site. Furthermore, during site inspections by SHPL, OE and EPCC's HSE staff, it is strictly checked that no forced labour 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 colour, race, origin and nationality. Only difference is the nature of job and relevant skills. However, no female is working as worker due to nature of job and local customs/norms.
Freedom of association and the effective recognition of the right to collective bargaining	No ban is imposed on workers with regard to freedom of association which is evident from the previous strikes for collective interests. However, formal labour union or association has yet not been established.

WORKING HOURS

No work shall be carried out on the Site on locally recognised days of rest, or outside normal working hours, unless: (a) Otherwise stated in the Contract, (b) the Employer gives consent, which shall not be unreasonably withheld, or (c) 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.	Work has been carried out on weekends but only with the consent of concerned staff/labour.
FACILITIES FOR STAFF AND LABOUR	
(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.

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

On both sites all time availability of health staff and facilities has been insured. 608 staff and workers visited medical facility during the month. However, majority of all visitors having normal check up with very few exceptions of minor cuts but rest are of minor in nature like gastro enteritis, flu and headache etc. Standby male nurse have been employed to support HSE department on both sites. Availability of first aid boxes has also been ensured at all sites. Furthermore, for major injuries and illness, MOU with Muzaffarabad General Hospital exists, however, no case has been yet sent to this private hospital.

Table 1: Medical Cases

Sr. No	Medical Cases	Frequency	Description
1	Medical Checkup /Examination/ Treatment	608	January: (91 Lower Site + 170Upper Site) Total = 261 February: (92 Lower Site+ 67Upper Site) Total = 159 March: (92 Upper Site + 96 Lower Site) Total = 188

During quarter due to sewerage line installation through access road under Muzaffarabad City Development Project, road has periodically been closed. To manage an emergency Rescue 1112 ambulance is available near Supreme Court building and additionally project vehicles are being place on both sides of blocked sections to deal any emergency.

(ix) Implementation of local labor standard

- GoP Labor Policy 2010 implemented.
- 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.
- Standards consistent with IFC's EHS General Guidelines.
- Prefer to hire unskilled /skilled staff and labor from AJ&K or KP.

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

Procedures for hiring have been adopted 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.

(xi) Local Employment Status:

As per the EPC contract, EPCC is bound to employ unskilled labour from local areas/ adjacent villages and for skilled jobs preference has to be given to locals having required qualification. Similarly, supply of materials and hiring of houses and vehicles has been one of the expectations from local community. Aforementioned commitments and expectations have been fulfilled as per the requirement.

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 labour, and skilled staff and labour with appropriate qualifications and experience, who are residents of AJ&K or KP especially who are the affectees of the Project"	Employment record detailed in below mentioned table
As per para 5 (n) of	"Non-technical jobs should be provided to the	Unskilled jobs have been provided

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Environmental approval issued KPK EPA Approval Condition	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”	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.

Classification		Total	AJ&K							KPK	
			Thori	Alda	Patrind	Tarcheela	Shoran	Others	Sum	Sarati	Others including Boi & Dallola
Daewoo	Total	314	32	-	10	5	1	121	169	6	139
	Manager	4	-	-	-	-	-	1	1	-	3
	Staff	263	19	-	8	2	1	106	139	3	56
	Labor	47	13	-	2	-	-	14	29	3	15
Kyung Dong	Total	108	1	8	3	1	-	61	74	1	33
	Manager	2	-	-	-	-	-	-	-	-	2
	Staff	18	-	2	-	-	-	10	12	-	6
	Labour	88	1	6	3	1	-	51	62	1	25
Sungbo C&E	Total	35	-	-	13	4	-	2	19	3	13
	Manager	1	-	-	-	-	-	-	-	-	1
	Staff	6	-	-	-	-	-	2	2	1	3
	Labour	28	-	-	13	4	-	-	17	2	9
Total	Total	457	33	8	26	10	1	184	262	10	185
	Manager	7	-	-	-	-	-	1	1	-	6
	Staff	287	19	2	10	3	1	118	153	4	130
	Labor	163	14	6	16	7	-	65	108	6	49

F. Environmental and Social Capacity

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

Frequent training programs, tool box meetings and talks have been conducted during quarter to enhance staff's capacity on essential aspects of environmental and social management. An orientation to environmental management, health and safety during construction work is part of induction form of all the staff and workers hired. Special training programs are arranged for the Daewoo E&C and Sub Contractor staff and workers on environmental management. Furthermore, daily HSE monitoring, toolbox meeting programs and other related activities have raised the awareness level among all staff and workers.

ii. HSE Weekly Meetings:

As per monthly HSE Plan weekly internal meetings and meetings with site construction teams have regularly been conducted on both sites list of meetings is attached as (Annex 3). Issues regarding compliance with HSE standards were the 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. Training /Campaign/Awareness Raising Programs Carried Out during Quarter:

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. The trainings and campaigns done during the quarter are attached as (Annexure 4). Sample attendance sheets and summary of training material is annexed as (Annex 5). Presence of HSE staff on day and night and also on weekends is essential but man power on sites have been decreased as most of the civil works have been stopped due to design issues.



Safety training session for Daewoo & Kyung Dong Staff

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. As per OE’s directions imperative environmental impacts will be included in induction Performa. The induction trainings done during the quarter is given below;

Table 2: Inductions

Month	Total No of Induction Trainings	Total No. of employees inducted	
		Lower Site	Upper Site
January	57 (Upper & Lower site)	107	52
February	47 (Upper & Lower site)	63	73
March	71 (Upper & Lower site)	98	98

vi. Tool Box Meetings

This is a consistent activity undertaken daily by EPCC before the start of every construction shift and is part of 3.5 Safety Campaign. Activity reports are being received from construction teams including sub-contractors. Daily safety message is conveyed to all staff and labor during the meeting by HSE staff.



Monthly safety campaign



Daily tool box talk

vii. Awareness Raising Material/Safety Sign/Campaign

To aware workers and community during quarter sign boards (more than 100) have been placed on appropriate locations. Safety Campaign as part of monthly HSE Plan has been conducted during quarter on both sites.



viii. Monthly Safety Award

To encourage staff and workers and promote safety culture on sites safety awards were given during reporting period.

Table 3: Safety Awards

Date	Sr.	Names	Company	Award	Location
6-2-2014	1.	Sim Sang Hoon	Daewoo E&C	Best Manager	P/H Site
	2.	Muhammad Ashraf	Daewoo E&C	Best Labor	P/H Site
	3.	Park Chul Young	Ho San	Best Manager	Weir Site
	4.	Abdul Hameed	Sungbo E&C	Best Engineer	Weir Site
	5.	Zaheer Akhtar	Daewoo E&C	Best Labor	Weir Site
03-03-2014	6.	Yim Sung Do	Kyungdong	Best Manager	P/H Site
	7.	Muhammad Jamil	Daewoo E&C	Best Labor	P/H Site
	8.	Majid Khan	Daewoo E&C	Best UA/UC	P/H Site
	9.	Lee Ho Seok	Sungbo E&C	Best Engineer	Weir Site
	10.	Jameel Nazir	Daewoo E&C	Best Labor	Weir Site
	11.	Abdul Rauf Abbasi	Daewoo E&C	Best UA/UC	Weir Site

ix. Daily Education/Training on site

During frequent site visit on spot education/training is an ongoing activity that enhance and promote safety culture on sites. Moreover, during inspection of equipment and color coding activities, workers and relevant staff are being educated.

x. Needs assessment of environmental and social management capacity (as relevant)

Continuous capacity building initiatives including more specific trainings on environment and social management are required for staff and labor. HSE department of EPCC delivered orientation sessions, awareness raising and capacity building sessions on environment and social management and also identified training needs of the staff and labor during the quarter. Special training programs are arranged for the Daewoo E&C and Sub Con. staff and workers at environmental & social issues. Furthermore, daily HSE monitoring, toolbox meeting programs and other related activities have raised the awareness level among all staff and workers.

G. Stakeholder Consultation/CSR Activities

1. Details of consultations, if any, with local communities, nongovernmental organizations, civil society groups, and other stakeholders, including affected people:

To initiate and sustain constructive external relationships with Project stakeholders particularly with civil society organizations, consultation is an important tool to enhance the social performance of the Project. Consultations/meetings have been made with all stakeholders including local community and civil society groups during reporting period to improve the project's implementation.

Few professional services have been hired by EPCC from locally based individuals and organizations during the quarter which are as under;

- i. Flora and Fauna Study by NGO Edinburgh DIRECTAID
- ii. Water Quality tests by NGO Edinburgh DIRECTAID
- iii. Slope studies by NGO Edinburgh DIRECTAID(to be undertaken)
- iv. Two ambulances rented out from Pakistan Red Crescent Society AJK
- v. HSE sign board preparation and printing activity is being undertaken by vendors (Add City) resident of Patrind village who are affiliated with Kunhar Welfare Organization. Under ILO funding, Patrind based Kunhar welfare organization established multipurpose technical institute "Add City" to provide wood work, welding, plumbing and printing trainings to unskilled locals from Patrind. Add City owner Mr. Khurshid 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. Company pay for all works undertaken by ADD City.

Locals are being informed for job opportunity and hiring of services and works to be subcontracted. Employment record is given in Section E above. Houses and vehicles have been rented from locals and civil works are being allocated to local contractors on priority basis.

Following organizations have been consulted during the quarter to improve CSR activities however no issues were raised by the following CSOs.

Organization Name	Location	Purpose/ issues discussed	Remarks
1- Sahara Welfare Organization	Dalola- (Upper Site KPK Part)	<ul style="list-style-type: none">▪ To promote Environmental and Safety Awareness among locals and school children.▪ To inform the local community about socioeconomic benefits of the project at local and national level.▪ To involve them in project development activities▪ To create a sense of project ownership as stakeholders	No issues raised
2- Rural Development Foundation	Sarati- (Upper Site KPK Part)		
3- TanzeemUIAwan	Daedal Mera-(Upper Site KPK Part)		
4- Kunhar Welfare Organization	Patrind- (Upper Site AJK Part)		
5- Press for peace	Muzaffarabad- (Lower Site AJK)		
6- Local Action Committee	Thuri/Lower Chatter Muzaffarabad- (Lower Site AJK)		
7- Pakistan Red Crescent Society	Muzaffarabad- (Lower Site AJK)		
8- Edinburgh DIRECTAID	Muzaffarabad- (Lower Site AJK)		

Formal and informal meetings and discussions with communities and other stakeholders is a consistent activity which is undertaken on emergence of issues such as employment, sub contracts, materials supply, road safety and security to improve the Project's implementation. During the period, following meetings were conducted by the EPCC;

- i. Meeting with locals from Sarati to discuss issues arising due to night shift works & heavy traffic on Project access road (26 January 2014). It was agreed that EPCC will remove the pressure horn from vehicles, road will be made clean and fence along road side will be repaired. All agreed actions were undertaken by the EPCC.
- ii. Meeting with locals from Patrind village regarding employment issues was held on 3rd February 2014 which was facilitated by Mr. Fayyaz Qureshi "Community Coordinator". It was agreed that information regarding new opportunities will be disseminated among locals through public notices on prominent locations and through community coordinators. Subsequently agreed mode of communications has been adopted.
- iii. Meeting with locals from Thuri/ Lower Chatter was held on 16th March 2014 at lower site camp office to resolve their internal conflicts regarding material supply and Access road. Locals were convinced to work peacefully and smoothly.

Coordination meetings were conducted during the quarter with the government departments to discuss the following;

- i. Site Security issues (Meeting with Inspector General Police AJK on 17th February 2014)
- ii. Implementation of Social Uplift Plan (Meeting with District Administration 20th February 2014)
- iii. Environmental Matters (Meeting with DG KPK EPA in Peshawar on 20th January 2014).
- iv. Access road repairing work (Meeting with Development Authority Muzaffarabad AJK 13th March 2014)

Although no written or formal agreement was made during above mentioned meetings but some actions were agreed by the EPCC to undertake for smooth working on the Project. Agreements are as follows: (i) Security directions issued by Police Department will be followed by the expatriate Korean staff, (ii) It was agreed that some interventions as per social uplift plan will be undertaken during construction phase as and when needed. Furthermore EPCCC will provide data of local employment to District administration, (iii) EPCC agreed to take corrective actions as indicated by EPA to address local community complaint. The complaint registered by residents of Sarati village regarding noise and dust was addressed. The representatives from the village were called and tests were conducted in their presence. The results compared with the NEQS 2010 revealed that the values found during peak working hours in the presence of the local residents of Sarati falls

within the permissible range of particulate and noise level, (iv) EPCC agreed that damaged sections of Access road will be repaired after installation of sewerage lines und Muzaffarabad Development Project. As follow up, condition of the road was improved by EPCC on certain sections.

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

- Inauguration ceremony of new batching plant at lower site was held involving local religious scholars and school teachers where a tradition joint prayer was held.
- On March 31, 2014, in Dalola village on annual result day an environmental awareness session was held by EPCC in public school Kinat shaheen academy (class 1-8th). Prizes and refreshment was also arranged by EPCC. The activity was undertaken in collaboration with Local NGO Tanzeem ul Awan,
- Environmental monitoring activities are being organized by a local based NGO,



Environmental Education session in Shaheen Academy Dallola

H. Issues, Status of Implementation of Mitigating Measures in the Environmental and Social Management Plan and Compliance with Environmental Qualities and Environmental and Social Requirements

Regular (daily) monitoring was done by OE and EPCC's HSE staff on both sites to monitor the compliance status of IFC performance standards, ADB's environmental and social safeguard policies, environmental conditions of EPA's and other regulations and more specifically environmental and social management plan implementation. Non compliances with recommended standards and regulations were recorded and reported on daily, weekly and monthly. EMP Compliance status is attached as (**Annexure 6**).

Environmental monitoring under EMP:

Following activities have been undertaken as part of environmental monitoring:

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Environmental component	Standards (NEQS)	Compliance/Mitigation measure
Air Quality	EPA ambient air quality (EPAs standards for each Parameter)	<p>NEQS:</p> <p>Detecting seven hazardous gases in tunnel to ensure the Air Quality in Tunnel. i.e. CO, CO₂, NO, NO₂, O₂, H₂S, LEL (Methane)</p> <ul style="list-style-type: none"> ▪ 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. ▪ Use of ventilator during work in HRT is essential. Respiratory protective masks have been issued to tunnel workers/visitors.
Water quality	WHO Guidelines (EPAs standards for each Parameter)	<ul style="list-style-type: none"> ▪ Tests for drinking water quality have already been conducted during month of March(Annex- 8) ▪ Waste water from tunnel is treated as sedimentation tanks have been constructed on each site.
Noise levels /Vibration	EPA ambient noise standards and worldwide vibration standards.	<p>Noise:</p> <ul style="list-style-type: none"> i. Noise prone activities are avoided during night time. No open blasting occurred during quiet hours. Intensity of noise and has been monitored to compare it with established standards. ii. Provision of necessary safety and personal protective equipment such as ear plugs etc are ensured during high noise activities like tunnel blasting. iii. Excavators and all heavy machines are lubricated in a routine matter to minimize the noise and to increase the life of equipment <p>Vibration:</p> <ul style="list-style-type: none"> i. 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.

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Environmental component	Standards (NEQS)	Compliance/Mitigation measure
Soil quality	EPA quality standard (Different standards for each Parameter)	i. Tests to be conducted through private lab/company. ii. No environmental incident except small soil contamination has been observed.
Flora	Visual observations by relevant Forest professional during EIA study.	Study /monitoring during quarter undertaken (Annex-9)
Fauna	Observation by relevant wildlife & Fisheries professional during EIA study.	Study /monitoring for quarter undertaken (Annex-10)



Water quality monitoring on projectsite and in surrounding villages



Flora monitoring and Fish fauna monitoring (upstream & downstream Kunhar River)

i. 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 comprising of hard hats, safety shoes, jacket and sand dust masks depending upon the job specification to prevent injuries. Hygienic inspections have been made by medical staff. As per usual morning physical exercise has also been undertaken regularly at both sites. The EPCC prepared and Emergency Response Plan for any unforeseen incident. 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) During quarter more warning sign boards have been placed on both sites indicating construction hazards to protect community
- 2) Medical facilities available at the Project sites can also be used for nearby community in case of emergencies. Community people have been informed through community coordinators who have been hired from the local communities and are in continues liaison with their concerned communities. Furthermore, information is being

disseminated through local employees and community personnel. It is worth mentioning here that people living in the villages are considered as an extended family and it has commonly been observed that if information is shared with one person it will certainly be shared among all in same locality. There is no particular schedule of the meeting with the locals and standard set of questionnaire/template for the meetings. The coordination meeting usually undertaken if any issue is raised by the locals and the Company receives any demands/complaints from them.

- 3) A strong liaison is established with concerned Government Departments (Police, Interior and administration) for site security arrangements.
- 4) Necessary road safety & community awareness sign boards were installed to mitigate possible hazards
- 5) Blasting activities have been managed appropriately and in a safe and secure manner keeping in view the community concerns and standard procedures.
- 6) Detecting seven hazardous gases in tunnel to ensure the Air Quality in Tunnel. i.e. CO, CO₂, NO, NO₂, O₂, H₂S, LEL (Methane)
- 7) Use of ventilator during work in HRT has been recommended essential. Respiratory protective masks have been issued to tunnel workers.
- 8) To ensure dust suppression due to transportation activity, unpaved roads are being sprinkled with water at least twice a day.
- 9) The EPCC is taking all necessary measures to limit pollution from dust and any wind-blown materials during construction.

ii. 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.

Table 4: Sources of CO₂

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. To avoid open dumping of waste, Waste Management Plan have been established and implemented. For temporary storage of waste proper waste collection and storage areas have been designated to ensure good

	environmental health. After OE's intervention on waste disposal at Municipal Corporation Muzaffarabad landfill site EPCC HSE team conducted site survey of the disposal facility to address the OE's concerns about the said facility. Report is attached as (Annexure 7)
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
Wood and wood waste	Heaters are provided to the labor to discourage burning wood and coal for heating purposes during month of January and February. HSE staff keeps a look to ensure no wood burning is being carried out on site
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

iii. 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

These plans are under implementation; however, some changes have been made in Project area due to which the waste management plan has been updated accordingly to meet up with the waste management requirement of the OE and Project EMP.

a- Plan for Disposal of Excavated Material

Excavated material is being disposed off in waste disposal area approved as per EIA. At lower site disposal area has embankment and partially filled where batching plant, stock yard are developed and M&E workshop is in progress.

b- Plan for Waste Management

After OE's concerns about mishandling of Project waste, detailed waste management plan was prepared by EPCC and submitted to OE during the reporting quarter. All the waste from lower site is being sent to MCM waste disposal facility and record is maintained. However, during blockage of access road waste generated was buried in trenches as no other suitable alternative was available. Waste at the sites consists primarily of hydrocarbons, cement and concrete. Waste including cement contaminated soils, vegetation debris with little or no commercial value, scrap metal, wood waste, pallets and packaging materials are small scrap wood, plywood, wood shavings, cartons, planks, thick cardboard, damaged cable drums, wooden crates, polyurethane, broken glass or glass fiber, plastic waste, grit blasting waste, domestic waste including sewage waste and kitchen waste, minor medical waste and pallets. The solid waste produced has randomly quantified.

c- Plan for Traffic Management

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 as indicated by OE. Furthermore, for heavy vehicle a diversion has been made near camp office lower site to mitigate risks and noise near schools, residential area and camp office as per initial traffic management plan.

d- Social uplift plan

Revised social uplift plan (SUP) was submitted by EPCC to SHPL in March 2013. Besides SUP various activities have also been undertaken to facilitate locals such as subletting works, supply of construction material. Status of SUP is as under:

Table 5: Social Uplift Activities

SR.	PROPOSED ACTIVITY	STATUS
1.	Bridge Across Jhelum River	✓ On August 31, 2012, the bridge has been connected Lower Chatter Muzaffarabad to Alda village on the right bank of Jhelum river. Now, vehicular traffic access is available for the locals to across the river.
2.	Connects Sarati Village (KP) to Patrind villages (AJK)	✓ Downstream cofferdam is being used temporary access bridge and after the completion of the construction there will be a permanent bridge on the weir deck which will be used by the locals to cross the Kunhar river between both the sides once the Project is commissioned on December 31, 2016

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SR.	PROPOSED ACTIVITY	STATUS
3.	Improvement of existing road	✓ The road from Supreme Court to Children Park will be improved and upgraded where possible but sewerage line installation under city development project is in progress on same road. Improvement of access road is a continuous activity which is undertaken by the EPC Contractor if any repair is required at any section of the access roads
4.	Construction of new road	<ul style="list-style-type: none"> ✓ 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 use by the locals after December 31, 2016 ✓ At present an unpaved road has been constructed on above mentioned track for construction activities which will be improved after construction phase i.e. December 31, 2016
5.	Improvement of the sites	✓ After construction phase December 31, 2016
6.	Medical treatment for local residents	✓ HSE Clinic and ambulances are available in case of any emergency on both sites
7.	Local Employment	✓ Unskilled jobs have been provided to local residents whereas preference has been given to locals for technical positions subject to required qualification.
8.	School Support	✓ School located at Sarati village (Deedal) has partially been completed by EPCC. Roof, ceiling, windows, doors and internal finishing spending an amount of 37000 US\$.
9.	Improvement of water supply	<ul style="list-style-type: none"> ✓ Water pipe line had been developed from existing water tank to Sarati village (GI Pipe : D50mm, L230m) ✓ The well had been developed at Batching Plant area during construction period and it will be transferred to local residents after construction phase i.e. December 31, 2016. ✓ The well had been developed at Powerhouse area for construction and it would be transferred and supplied to Alda villager after completion of construction i.e. December 31, 2016. ✓ Water quality tests of all sources in project vicinity and adjacent villages have been undertaken on 22-23 March 2014 and results are being compiled.
10.	Improvement of area after completion of construction	✓ Project area used for stocks, temporary buildings, equipment storage and other various activities will be changed to the park, playground etc. after construction work i.e. December 31, 2016.
11.	Embankment Protection	✓ From the Access Bridge area along the riverside, slope protection and embankment will be provided for avoidance erosion of river bank and inundation of Lower Chatter during flood season. The rip-rap protection will be installed at the surface of embankment and gabion protection will be installed around Access Bridge. Partial works have been undertaken. This is expected to be completed by 31 st of May 2014.

I. Resettlement Plan Implementation

i. Scope of Land Acquisition and Resettlement Impacts

Land Acquisition

Permanent Land Acquisition	790.10 Kanal
Temporary Land Acquisition	82.55 Kanal
Total	872.60 Kanal

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
Total Permanent Land Acquisition (Kanal)		100.9	313.65	361.2	14.35	790.1
TEMPORARY LAND						
1	Colony of Expatriate construction staff, Switchyard, labour 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)		155.65	313.65	389	14.35	872.65

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. 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	67,797,248	73.31%	196	321
Headpond (Shoran Village AJ&K)	130.75	75,181,250	73,053,742	97.17%	611	196
Weir + Headpond (Patrind Village AJ&K)	341.1	204,037,798	162,953,573	79.86%		337
Forest land for Surge Tank (Alda village)	47.75					
B. Trees						
Alda		1,890,635	1,865,684	98.68%		19
Shoran		757,391	654,331	86.39%		55
Patrind		837,882	635,958	75.90%		32
Sub-Total	601.4	375,184,780	306,960,536	81.82%	807	960
2. KPK						
Land/Property/Trees						
Weir + Headpond (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 received the payment is higher than the number of affected persons is due to the repetition of the owners names in the payment vouchers.

Note: The number of persons received the payment has not been updated as detail of the person received the payment has not been shared by revenue department..
For clarity, payment for trees has been separated from the land cost of AJ&K villages which shows decrease in %age from second quarter.

i. Resettlement and Reconstruction

Updates on housing relocation and reconstruction

Out of the 28 households(As per EIA), whose houses were displaced/resettled due to the project land acquisition, 24 have constructed new houses in adjacent villages and others have acquired land in urban areas to construct houses. Newly constructed houses are far better than the acquired properties. Living standards have also 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. Mr. Sajjad, Mr. Qayyum and Mr. Aurangzeb from Sarati village had not vacated properties till reporting period. These owners are residing at location which will be submerged once the reservoir is filled after construction phase of the Project and the Company have shown its goodwill to these owners by not forcing them to vacate their houses but they are being reminded for the same from time to time. Others have made investment in alternative lands in urban areas for better facilities. However, it is reality that compensation amount has benefited PAPs together socially and economically. List of the newly constructed houses is presented as under;

Sr.	Name	Location	Status
1.	Mr. Sarfaraz Abbasi	Alda Power House Site	Construction completed
2.	Mr. Tanveer	Alda Power House Site	Construction completed
3.	Mr. Aslam	Alda Power House Site	Construction completed
4.	Mr. Asif	Alda Power House Site	Construction completed
5.	Mr. Zahid	Alda Power House Site	Construction completed
6.	Mr. Amjad	Alda Power House Site	Construction completed
7.	Mr. Munir	Alda Power House Site	Construction completed
8.	Mr. Safeer	Alda Power House Site	Construction completed
9.	Mr. Sadaqat	Alda Power House Site	Construction completed
10.	Mr. Saleem	Sarati Weir Site	Constructed new house and also purchased a plot in Abbottabad
11.	Mr. Khalid	Sarati Weir Site	Constructed new house and also purchased a plot in Abbottabad
12.	Mr. Qayoom	Sarati Weir Site	Constructed new house and also purchased a plot in Abbottabad
13.	Mr. Sajjad	Sarati Weir Site	House Constructed with compensation
14.	Mr. Arif	Sarati Weir Site	House Constructed with compensation
15.	Nazir Sarati	Sarati Weir Site	House Constructed with compensation
16.	Abdul Rehman	Sarati Weir Site	House Constructed with compensation
17.	Billal Ahmed	Patrind / Tarcheela Weir Site	House Constructed with compensation
18.	Ghulam Mustaffa house + cloth market in Garhi Habibullah	Patrind / Tarcheela Weir Site	House Constructed with compensation
19.	Fayyaz Qureshi	Patrind / Tarcheela Weir Site	House Constructed with compensation
20.	M. Wajid	Patrind / Tarcheela Weir Site	House Constructed with compensation
21.	M. Sadheer	Patrind / Tarcheela Weir Site	House Constructed with compensation
22.	M. Shabir	Patrind / Tarcheela Weir Site	House Constructed with compensation

23.	M. Saeed	Patrind / Tarcheela Weir Site	House Constructed with compensation
24.	Mr. Aurangzeb	Patrind / Tarcheela Weir Site	Constructed two houses in Patrind and in Thuri



Pre-acquisition structure own by PAPs in Alda village



Post-acquisition reconstruction with compensation amount in Alda village

ii. 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 |

Consent from District Administrations (AJK & KPK) is required for proposed GRC. Availability of District Revenue Officers is difficult to ensure as and when required. Although, issues related with acquisition and compensation and community complaints are being addressed with the involvement of same authorities. In practice same forum is functional but officially has not yet been established.

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

UA/UC CARDS

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Sr. No	Date	Site	Location	UA/UC Observer	Department	UA/ UC Observation	Immediate Corrective action if taken	Corrective Action
1.	10-2-2014	P/H	Lower site camp office store room	Rashid Awan	Construction	It was found that the plastic fiber used in QA/QC lab was spread and kept in open air in the store room. It's danger because the fiber if inhaled can cause cancer and lungs diseases and harmful for the skin and eyes as well	Instructed QA/QC person to keep the plastic fiber in a safe manner	Plastic fiber was collected and placed in bags safely and it was ensured that no staff or worker will be directly exposed to the fiber.
2.	11-2-2014	P/H	Daewoo Camp Office	M. Adnan Babar	QA/QC	Fiber in QA/QC department was observed kept in open air in the store room which is dangerous for health and contains potential for cancer and lungs diseases	Fiber was removed and placed in safe manner in presence of HSE officer	-Do-
3.	12-2-2014	P/H	HRT	M. Adnan Babar	QA/QC	At the entrance of HRT, Kyung Dong must depute a person to record the entrance and exit in the HRT. He should maintain register with following information: 1- who is entering? 2-how many no. of persons? 3-why entering? 4-time of exit?	Observations were discussed in HSE weekly meetings	Tunnel status board has already been placed outside the tunnel. HSE staff on HRT keeps a check on the entrance and exit of individuals in HRT. However CCTV camera have been installed on HRT to keep a record of movement in-out of HRT
4.	15-2-2014	P/H	HRT	Majid Khan	Construction	1. Emergency phone and telecom line must be made available after the lapse of every 300m keeping in view the total length of tunnel 2. Near the face, the electrical wires of heavy equipment as well as the standing lights are observed lying in the stagnant water 3. First aid box must be installed inside tunnel keeping in view its length. 4. Wires used in blasting must confirm to international norms 5. Proper drainage must be ensured on access road during rainy season	Relevant departments have been informed about the mentioned activities	HSE Dept. has already taken actions on most of the activities for all mentioned activities concerned departments have been asked to undertake the required measures.

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Sr. No	Date	Site	Location	UA/UC Observer	Department	UA/ UC Observation	Immediate Corrective action if taken	Corrective Action
	12/02/2014	P/H	Upstream cofferdam	Shahid	Construction	Heavy rainfall cause flood situation, the alert alarm water level is fixed to 753.00 at inlet portal of diversion tunnel. It is observed that water level indicator shows up to only level 747.0m. This is an unsafe condition for Kunhar river gage observer. This will cause delay in timely dissemination of information to site workers about alert and warning signals.	-	
5.	24/02/2014	P/H	Daewoo Office and Site	M. Adnan Babar	QA/QC	Hand wash facility in Pakistani mess is poor. No soap or hand wash is placed. The storage room is also not proper and hygienic	-	Hand wash and soap provided and storage room made neat and clean
6.	24/02/2014	P/H	Daewoo Office and Site	M. Adnan Babar	QA/QC	The speed breaker provided at the entrance and project access road is not color coded or made visible through any high vision material. It can result in accident, a person sitting in fast moving car would get severe head injury by collision with dash board. Motorcyclists could face a risk too	-	High viz material applied on that speed breaker
7.	24/02/2014	P/H	Daewoo Office and Site	M. Adnan Babar	QA/QC	At some locations of powerhouse site access road, the edges must be highlighted by installing warning cordons / tap etc. Especially at night when two dumpers or concrete trucks face in opposite direction, the head light would create difficulty leading to a fall in the ditch with serious injuries.	-	Warning tapes have been installed on the edges of the road to overcome any accident.
8.	24/02/2014	P/H	Daewoo Office and Site	M. Adnan Babar	QA/QC	The work going on at power house secant piling area is completely out of discipline and highly un managed conditions. There is no clear distribution of activities, there are no special boards, warning sign boards, activity information boards, pedestrian walkway etc.	-	Areas are now distributed for work and proper installation of sign boards is again inspected to make sure the proper installation of sign boards for pedestrian walkway and other mentioned issues
9.	24/02/2014	P/H	Daewoo	M. Adnan	QA/QC	The highly compressed air pipes in the HRT must	-	Compressed air pipes are made visible by

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Sr. No	Date	Site	Location	UA/UC Observer	Department	UA/ UC Observation	Immediate Corrective action if taken	Corrective Action
			Office and Site	Babar		be illuminated and highlighted by using warning tape around it. Otherwise the dump trucks/ concrete trucks or heavy machineries may strike it which will result in big destruction		applying warning tapes.
10.	24/02/2014	P/H	Daewoo Office and Site	M. Adnan Babar	QA/QC	Heavy machineries working inside the tunnel must be highlighted to avoid collision. There is too much incoming -outgoing heavy machinery in tunnel like jumbo drill, jack hammer, concrete trucks, dump trucks, shotcrete machine and charging car. The sides, front and back of these heavy machineries must be highlighted by warning tape.	-	Fronts and backs of the heavy machineries are applied with high viz stapes to make their appearance visible at night time
11.	24/02/2014	P/H	Daewoo Office and Site	M. Adnan Babar	QA/QC	Heavy mechanical operators of any department or sub-contractor should not be hired without the notice/no- objection certificate of HSE department. HSE Department shall ensure and check him regarding qualification, education, experience, health issues and previous accident history (if any).	-	During induction trainings HSE department shall take into consideration all these points.
12.	24/02/2014	P/H	Daewoo Office and Site	M. Adnan Babar	QA/QC	At powerhouse site (specially at the piling site) emergency contact numbers of HSE staff are not present, Contacts of Daewoo HSE staff & HSE staff of subcontractors must be installed on the notice board	-	Placement of emergency contact numbers was ensured at construction sites
13.	24/02/2014	P/H	Daewoo Office and Site	M. Adnan Babar	QA/QC	All the subcontractors (Kyungdong, sungbo, ZK, others) must be advised to submit the monthly progress report of their HSE actions and policies to the HSE manager of Daewoo E&C. The Construction department of Daewoo and other subcontractors must submit their weekly plan of activities, so that HSE manager can plan the HSE	-	

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Sr. No	Date	Site	Location	UA/UC Observer	Department	UA/ UC Observation	Immediate Corrective action if taken	Corrective Action
						policies accordingly.		
14.	24/02/2014	P/H	Daewoo Office and Site	M. Adnan Babar	QA/QC	Specially in HRT where heavy machineries are at work like drilling, jack hammer etc all the labor staff is wearing loose clothing, All the subcontractors (Kyungdong , Sungbo, Zk & others) must be advised to avoid the use of local loose clothing.	-	The mentioned instructions were verbally given to all subcontractors and PPEs & Coveralls have also been provided to employees
15.	24/02/2014	P/H	Daewoo Office and Site	M. Adnan Babar	QA/QC	The basin provided at the entrance of office for washing safety shoes of site was not cleaned for last 3 months. At the main office entrance just imagines this type of bad housekeeping how would a visitor think of this? What picture we give them? Also this dust / concrete particles / chemicals goes inside the offices and causes severe health issues through respiration	-	The basin has been washed and made clean and proper
16.	24/02/2014	P/H	Daewoo Office and Site	M. Adnan Babar	QA/QC	The office staff must be encouraged to use emails. Printing of papers must be minimized. Both sides of paper must be used for usual / rough drafting printing. At the end paper must be saved in a bin container and handed over to HSE Envir; Engineer who will deliver this to paper factories for recycle. report will be submitted to OE	-	During tool box talks all staff has been made aware of re use of papers and minimization of paper waste.
17.	07/02/2014	Weir	Stair Case near Weir Road Area	Abdul Rauf Abbasi	Construction	One Strip of steel stair was damaged badly in the middle, so it is very dangerous to use that steel Ladder specially in night shift	Informed HSE Assistant Manager and requested for immediate action	Repaired the Strip of stair case
18.	08/02/2014	Weir	Site Stairs (HRT)	Salar Jadoon	Construction	1- Ladder is broken down that can cause serious injury because that path is used by everyone in day and night shift, 2- In HRT, during rock bolting, ventilator was off, suffocation occurred there while working in such type of confined	-	Regarding Ladder issue, that ladder was brought back to store. But regarding Ventilator, when the HRT was inspected by HSE Inspector, ventilator was working but the issue discussed with the Manager

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Sr. No	Date	Site	Location	UA/UC Observer	Department	UA/ UC Observation	Immediate Corrective action if taken	Corrective Action
						space areas.		Kyungdong
19.	16/02/2014	Weir	Weir Left Bank	Salar Jadoon	Construction	Workers were found working at height without any safety measure, if workers fell from there serious injury could happen	-	After information, the work at immediately stopped at site and the body harness provided to the workers
20.	20/02/2014	Weir	Sand Trap	Salar Jadoon	Construction	1- Pull out test was carried out there without any safety measures. 2- Shotcrete activity performed by irrelevant handling	Immediate site inspection	Checked PPEs and provision of body harness on site, only one person was found to be working without anybody harness, he was immediately stopped to do work and was provided with the body harness along with training
21.	24/02/2014	Weir	Sand Trap	Abdul Rauf Abbasi	Construction	At sand trap area, electrical cable for main DB was cut during excavation.	Work was stopped and Electrician was informed	After information, the HSE Manager, Admin Manager and Electrical Manager was informed about this serious hazard and within two days electrical department repaired all the cables
22.	25/02/2014	Weir	Sand Trap area	Abdul Rauf Abbasi	Construction	During rock bolting on sand trap area, some workers standing behind the machine on loose edge of the slope, it is very dangerous because may be operator cannot see the worker or slope edge	informed the operator and removed the worker from hazard area and put a flag man	Removed the worker from machine swinging area and near the slope edge and informed him about its hazards
23.	27/02/2014	Weir	Coffer Dam	Abdul Rauf Abbasi	Construction	At coffer dam area, access ladder is not proper, some strips are damaged and angle is also wrong, there is risk of falling, clapping & tripping	Informed HSE Site foreman to reinstall the ladder	That ladder was removed and new ladder was installed properly on both sides
24.	28/02/2014	Weir	Coffer Dam	Abdul Rauf Abbasi	Construction	At coffer dam area, during lifting and Loading, Rigger was not proper working that was a dangerous activity	informed the foreman about proper use of rigger and tag line	As per information of supervisor, HSE inspector checked the activity, but when he checked rigger was working properly, but tagline was missing so tagline was installed properly
25.	28/02/2014	P/H	Explosive area	Amir Rehman	Construction	Last night I drive my car from camp office to explosive area about 22:45 hrs. No security guard posted on gate stopped my car. That is a very	Nil	Security director was informed about this issue. HSE Staff at night shift was also informed they were asked to check security

Environmental & Social Monitoring Report (January-March 2014)

Sr. No	Date	Site	Location	UA/UC Observer	Department	UA/ UC Observation	Immediate Corrective action if taken	Corrective Action
						serious security concern		check post on regular basis.
26.	13/02/2014	P/H	Project area	M. Adnan Babar	QA/QC	Every department must be issued WORK PERMIT FORM before starting any activity at site; the site engineer must fill the Performa and submit to HSE. HSE Staff will go through the Performa and visit site also to check the hazards and arrangements, and then he will sign to give approval or disapproval.	Nil	HSE has already started permit to work system, trainings have already been given however suggestions will be considered.
27.	20/02/2014	P/H	Diversion Tunnel	Shahid	Construction	With the on-set rainy season which may cause flood, river gauge is marked up to EL740 at inlet portal of diversion tunnel. Flood alert level is fixed to E.L753.0 during the rainy / monsoon season, river gauge should be marked to E.L 755.0 to facilitate the emergency response team (ERT) in the coming flood / monsoon season.	-	Construction team has been informed and a comprehensive site specific evacuation plan has been prepared.
28.	10/03/2014	Weir	Sand Trap	Shafique	Sungbo	Road Sand trap area is dangerous due to slide, check and take a correct action	Road was blocked	Blocked the road entries and these days there is no work. Work is stopped on sand trap area and road is permanently blocked
29.	13/03/2014	Weir	Daewoo Office	Babar	Police	Firefighting team is needed on site	Mok drill undertaken	Emergency response team is already prepared and their contact numbers area already placed on workplace / project site
30.	15/03/2014	Weir	Sand trap & Explosive store	Touseef Ahmed	Sungbo	At Sungbo explosive store area there is no light, it is very risky due to dark in that area and at night time also, there exists the security risk	Concerned section was immediately asked for corrective actions	Lights were being provided from batching plant area and the issue was resolved
31.	17/03/2014	Weir	Coffer Dam	Khalid Bin Waleed	Sungbo	It is observed that coffer dam top level is very risky. There is no hand rail, so there needs to put the hand rail for fall protection	Site HSE team was informed to manage the issue.	The issue was discussed in HSE meeting with construction team upper site, and it was concluded that the work is finished in that area and there is no more need to go up side
32.	19/03/2014	Weir	Weir access road	Mehtab Ahmed	Construction	Weir Access Road's start turning point has very dangerous curve, according to the observers'	-	The issue was discussed with HSE Construction team a meeting was held

Environmental & Social Monitoring Report (January-March 2014)

Sr. No	Date	Site	Location	UA/UC Observer	Department	UA/ UC Observation	Immediate Corrective action if taken	Corrective Action
						opinion this curve should be two or three meter more wide		regarding the issue and that area was refilled and made wider
33.	25/03/2014	Weir	Front of sungbo coloni	Haroon	Sungbo	Kyungdong store back side fence wall is falling down slowly, there is a need of permanent wall for the store safety and passing way	-	Already informed to Admin section to repair or re-install the fence properly
34.	26/03/2014	P/H	Chemical Storage/ new batching plant area	Shahid	Construction	Safety is everybody's job, in chemical storage area it is observed that there is no single fire blanket / dry type fire extinguisher, there is no safety sign e.g., caution / chemical storage area/ authorized personnel only, there is no color coding, additionally safety guidelines are not outlined	-	Required Safety items (Fire Extinguishers and fire blankets) were installed and JSA was provided.
35.	19/03/2014	Weir	Disposal Area	M. Saleem	HSE	Due to expected flood in rainy season, retaining wall is required around the disposal area near the river edge to protect the property	-	Construction team was informed regarding the hazard and safety measures
36.	20/03/2014	Weir	New batching plant	M. Saleem	HSE	Heavy electric cable around the new batching plant area is very risky, and progress of Government Department is very slow on that, these dangerous cables should be removed quickly	Instructions issued to Site HSE team	Area was barricaded, but still cables need to be removed from there
37.	26/03/2014	Weir	Batching Plant Area	M. Saleem	HSE	at batching plant area on big hole was lying open (water bore), it was very risky, due to rain, the material elapses in all area which increases the falling hazard in that hole	Nil	Due to hole, the area was barricaded; the matter was discussed with the management to solve the issue.
38.	26/03/2014	Weir	brast wall	M. Saleem	HSE	Lifting of dozer from road to upstream cofferdam area is very risky because the road is narrow, the distance is more than the crane's capacity, please check the activity timely.	Nil	Checked the crane and inspected all other lifting equipments and a training has also been given for safe work

Annex-2

INSPECTIONS

Environmental & Social Monitoring Report (January-March 2014)

Sr.	Inspection	Location	Inspector	Date
1.	Fire Extinguishers Inspection	Powerhouse Site	S. Tariq Hussain	04/01/2014
2.	Batching Plant Inspection	Weir Site	M. Javed	20/01/2014
3.	Batching Plant Inspection	Weir Site	M. Javed	26/01/2014
4.	Color Coding	Weir Site	M. Javed	21/01/2014
5.	Hygienic inspection of kitchen staff	P/H Site	Dr.Billal	30/01/2014
6.	Fire Extinguishers Inspection	Powerhouse Site	S. Tariq Hussain	01/02/2014
7.	Drilling Rig/Derrick Inspection	Powerhouse Site	Addil Yusaf	23/02/2014
8.	Drilling Rig/Derrick Inspection	Powerhouse Site	Addil Yusaf	23/02/2014
9.	Heavy Equipment Inspection	Powerhouse Site	Addil Yusaf	28/02/2014
10.	Heavy Equipment Inspection	Powerhouse Site	Addil Yusaf	28/02/2014
11.	Heavy Equipment Inspection	Powerhouse Site	Addil Yusaf	28/02/2014
12.	Heavy Equipment Inspection	Powerhouse Site	Addil Yusaf	28/02/2014
13.	Gas test in HRT	Weir Site	Kamran	02/02/2014
14.	Plate forms inspection	Weir Site	M. Javed	02/02/2014
15.	Permit to Work Inspection	Weir Site	M. Javed	02/02/2014
16.	Ladders Inspection	Weir Site	Waqas	03/02/2014
17.	Gas test in HRT	Weir Site	Kamran khan	03/02/2014
18.	Inspection of Lock-out Tag-out compliance	Weir Site	M. Javed	03/02/2014
19.	Batching Plant Inspection	Weir Site	M. Javed	07/02/2014
20.	Permit to Work Inspection	Weir Site	M. Javed	08/02/2014
21.	Batching Plant Inspection	Weir Site	M.Javed	13/02/2014
22.	H R T Inspection	Weir Site	M.Javed	14/02/2014
23.	Blasting Inspection	Weir Site	Kamran khan	15/02/2014
24.	Ladders Inspection	Weir Site	Waqas	16/02/2014
25.	Heavy equipment Inspection	Weir Site	M.Javed	18/02/2014
26.	Batching Plant Inspection	Weir Site	M.Javed	20/02/2014
27.	Batching Plant Inspection	Weir Site	M.Javed	21/02/2014
28.	Scaffolds inspection	Weir Site	Waqas	22/02/2014
29.	Blasting Inspection	Weir Site	Kamran khan	23/02/2014
30.	Fire extinguishers Inspection	Weir Site	M.Javed	24/02/2014
31.	Heavy equipment Inspection	Weir Site	M.Javed	18/02/2014
32.	Batching Plant Inspection	Weir Site	M.Javed	20/02/2014
33.	Batching Plant Inspection	Weir Site	M.Javed	21/02/2014

Environmental & Social Monitoring Report (January-March 2014)

34.	Scaffolds inspection	Weir Site	Waqas	22/02/2014
35.	Blasting Inspection	Weir Site	Kamran khan	23/02/2014
36.	Fire extinguishers inspection	Weir Site	M.Javed	24/02/2014
37.	Gas test in HRT	Weir Site	Kamran khan	24/02/2014
38.	Environmental Inspection	Weir Site	Waqas	24/02/2014
39.	Batching Plant Inspection	Weir Site	M. Saleem	24/02/2014
40.	Gas test in HRT	Weir Site	M. Javed	25/02/2014
41.	Inspection of Electric cables, DB/cords	Weir Site	M. Javed	25/02/2014
42.	Ladders & Scaffold Inspection	Weir Site	Waqas	25/02/2014
43.	Gas test in HRT	Weir Site	Kamran khan	26/02/2014
44.	Batching Plant Inspection	Weir Site	Waqas	26/02/2014
45.	Heavy equipment Inspection	Weir Site	M.Javed	26/02/2014
46.	Heavy equipment Inspection	Weir Site	M. Javed	27/02/2014
47.	Permit to Work Inspection	Weir Site	M.Javed	27/02/2014
48.	Batching Plant Inspection	Weir Site	M.Javed	27/02/2014
49.	Plate forms inspection	Weir Site	Waqas	27/02/2014
50.	Gas test in HRT	Weir Site	Kamran khan	28/02/2014
51.	Heavy equipment Inspection	Weir Site	M.Javed	28/02/2014
52.	Batching Plant Inspection	Weir Site	Waqas	28/02/2014
53.	Heavy Equipment Inspection Pickaway Crane Model 2008 / PT-185	Powerhouse Site	Yasir Ghauri	03/03/2014
54.	Heavy Equipment Inspection Pickaway Crane Model 2008 / PT-184	Powerhouse Site	Yasir Ghauri	03/03/2014
55.	Heavy Equipment Inspection Wheel Loader WL-623	Powerhouse Site	Addil Yusaf	03/03/2014
56.	Heavy Equipment Inspection Mixer Tank MT-408	Powerhouse Site	Yasir Ghauri	04/03/2014
57.	Heavy Equipment Inspection Mixer Tank MT-431	Powerhouse Site	Yasir Ghauri	04/03/2014
58.	Heavy Equipment Inspection Wheel Loader WL-623	Powerhouse Site	Yasir Ghauri	04/03/2014
59.	Heavy Equipment Inspection Mixer Tank MT-430	Powerhouse Site	Yasir Ghauri	04/03/2014
60.	Heavy Equipment Inspection Mixer Tank MT-406	Powerhouse Site	Yasir Ghauri	04/03/2014

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61.	Heavy Equipment Inspection Mixer Tank MT-405	Powerhouse Site	Yasir Ghauri	04/03/2014
62.	Heavy Equipment Inspection Excavator Ex-0551	Powerhouse Site	Yasir Ghauri	04/03/2014
63.	Heavy Equipment Inspection Crawler Drill CD-95	Powerhouse Site	Yasir Ghauri	05/03/2014
64.	Heavy Equipment Inspection Crawler Drill CD-098	Powerhouse Site	Yasir Ghauri	05/03/2014
65.	Heavy Equipment Inspection Pump Car PC-068	Powerhouse Site	Yasir Ghauri	06/03/2014
66.	Heavy Equipment Inspection Pick Way Truck PT-192	Powerhouse Site	Yasir Ghauri	06/03/2014
67.	Heavy Equipment Inspection Pick Way Truck PT-185	Powerhouse Site	Yasir Ghauri	06/03/2014
68.	Heavy Equipment Inspection Pick Way truck PT-184	Powerhouse Site	Yasir Ghauri	06/03/2014
69.	Heavy Equipment Inspection Dump Truck DT-2267	Powerhouse Site	Yasir Ghauri	06/03/2014
70.	Heavy Equipment Inspection Cargo Truck CT-401	Powerhouse Site	Yasir Ghauri	06/03/2014
71.	Heavy Equipment Inspection Folk Lifter FK-245	Powerhouse Site	Yasir Ghauri	06/03/2014
72.	Heavy Equipment Inspection Dump Truck MCM-A12	Powerhouse Site	Addil Yusaf	06/03/2014
73.	Heavy Equipment Inspection Dump Truck TKB-921	Powerhouse Site	Addil Yusaf	06/03/2014
74.	Heavy Equipment Inspection Dump Truck ZBT-1346	Powerhouse Site	Addil Yusaf	06/03/2014
75.	Heavy Equipment Inspection Dump Truck TKD-831	Powerhouse Site	Addil Yusaf	06/03/2014
76.	Heavy Equipment Inspection Dump Truck TKB-414	Powerhouse Site	Addil Yusaf	06/03/2014
77.	Health hygiene inspection of Kitchen area & Food	-Do-	Dr. Billal	07/03/2014
78.	Inspection of washrooms	-Do-	Dr. Billal	07/03/2014

Environmental & Social Monitoring Report (January-March 2014)

79.	Crane inspection	Weir Site	Waqas Shah	01/03/2014
80.	Fire Extinguishers Inspection	Weir Site	Waqas Shah	03/03/2014
81.	New Batching plant Inspection	Weir Site	M. Saleem	04/03/2014
82.	General inspection	Weir Site	Kamran Khan	05/03/2014
83.	Batching Plant Inspection	Weir Site	M. Javed	06/03/2014
84.	Fire Extinguishers checking	Weir Site	Waqas Shah	07/03/2014
85.	General inspection	Weir Site	Kamran Khan	07/03/2014
86.	General inspection	Weir Site	Waqas Shah	08/03/2014
87.	Inspection of Rock bolting in HRT	Weir Site	M. Javed	09/03/2014
88.	Heavy equipment Inspection	Weir Site	Waqas Shah	09/03/2014
89.	Heavy equipment Inspection	Weir Site	Waqas Shah	10/03/2014
90.	Batching Plant Inspection	Weir Site	M. Saleem	10/03/2014
91.	Inspection of Communication system in HRT	Weir Site	M. Javed	10/03/2014
92.	Scaffolding Inspection	Weir Site	M. Saleem	11/03/2014
93.	Labor Shelter Inspection	Weir Site	M. Saleem	12/03/2014
94.	Road inspection	Weir Site	M. Saleem	13/03/2014
95.	Permit to work inspection	Weir Site	M.Javed	14/03/2014
96.	Electrical inspection	Weir Site	M. Javed	15/03/2014
97.	Lifting Equipment	Weir Site	M. Javed	16/03/2014
98.	Scaffolding Inspection	Weir Site	Waqas	16/03/2014
99.	Plate form Inspection	Weir Site	M.Saleem	17/03/2014
100.	Ladder & Scaffold Inspection	Weir Site	M. Javed	18/03/2014
101.	Electrical equipments Inspection	Weir Site	Fayzan	19/03/2014
102.	Lifting Equipment Inspection	Weir Site	Waqas	20/03/2014
103.	Permit to work inspection	Weir Site	M. Javed	20/03/2014
104.	Batching Plant Inspection	Weir Site	M.Javed	21/03/2014
105.	Permit to work inspection	Weir Site	M. Saboor	22/03/2014
106.	Environment/ water Inspection	Weir Site	M.Javed	22/03/2014
107.	Blasting Inspection	Weir Site	M. Saboor	23/03/2014
108.	Inspection of Rock bolting in HRT	Weir Site	M. Javed	22/03/2014
109.	Permit to work inspection	Weir Site	Waqas	23/03/2014
110.	Batching Plant Inspection	Weir Site	M. Saleem	27/03/2014
111.	Permit to work inspection	Weir Site	M. Javed	28/03/2014
112.	Batching Plant Inspection	Weir Site	M. Javed	28/03/2014
113.	Permit to work inspection	Weir Site	M.Saboor	28/03/2014

MONTHLY HYGIENIC INSPECTION OF KITCHEN STAFF

Pakistan Patrind Hydro Power Pj

Dated: Jan 30, 2014

Sr.	Names	Location	Parameters						Comments
			Smoking	Nails	Clothes	Hair	Skin Disease	Sneezing	
1.	Mr. Oh	Camp Office	Ok	Ok	Ok	Ok	Ok	Ok	
2.	Liaqat Abbasi	Camp Office	yes	Ok	Ok	Ok	Ok	Ok	
3.	Tanveer Ahmed	Camp Office	Ok	Ok	Ok	Ok	Ok	Ok	
4.	Raja Azkar	Camp Office	yes	Ok	Ok	Ok	Ok	Ok	
5.	Ahsin	Camp Office	Ok	yes	Ok	Ok	Ok	Ok	Instructed to cut the nails
6.	Zaheed Ahmed	Lower Site	Ok	Ok	Ok	Ok	Ok	Ok	
7.	M Azam	Lower Site	yes	Ok	Ok	Ok	Ok	Ok	
8.	Waqas Ahmed	Camp Office	Ok	Ok	Ok	Ok	Ok	Ok	
9.	Iftikhar	Camp Office	Ok	Ok	Ok	Ok	Ok	Ok	
10.	Amjad Khan	Camp Office	Ok	Ok	Ok	Ok	Ok	yes	Use of mask recommended.
11.	M. Pervaiz	Camp Office	yes	yes	Ok	Ok	Ok	Ok	Instructed to cut the nails
12.	M. Khursheed	Camp Office	yes	Ok	Ok	Ok	Ok	Ok	
13.	Falak Sher	Camp Office	yes	Ok	Ok	Ok	Ok	Ok	
14.	Safeer Ahmed	Camp Office	Ok	Ok	Ok	Ok	Ok	Ok	
15.	Waheed Iqbal	Camp Office	Ok	Ok	Ok	Ok	Ok	Ok	
16.	Khaqan Abbasi	Camp Office	Ok	Ok	Ok	Ok	Ok	Ok	
17.	Sawal Khan	Camp Office	Ok	Ok	Ok	Ok	Ok	Ok	
18.	Adeel	Camp Office	Ok	Ok	Ok	Ok	Ok	Ok	

CHECKED BY


HSE Doctor
Dr. Bilal


HSE MANAGER

HYGIENIC INSPECTION OF KITCHEN AREA AND FOOD

(Kyung Dong)

Pakistan Patrind Hydro Power Project

Date:07/03/2014

Sr.	PARAMETERS	☑/☒
13.	Cleanliness	x
14.	Housekeeping	x
15.	Flies / Any other insects	✓
16.	Food Stock handling	x
17.	Hygiene	x
18.	Food Quality	x
Others		
<p>Observations:</p> <ul style="list-style-type: none">• No cleanliness• No proper housekeeping• Food stock handling not proper• Hygienic conditions are worse• Food quality is not up to the standard.		
<p>Recommendations:</p> <ul style="list-style-type: none">• Need improvement in cleanliness• Housekeeping must be proper.• Hygienic conditions must b maintained.• Need improvement in food quality.• Food stock handling must be in a proper way.		


HSE Doctor
Bilal Ahmed


HSE MANAGER
Chung Myung Hun

Annex-3

WEEKLY MEETINGS

Environmental & Social Monitoring Report (January-March 2014)

Sr.	Meeting	Date	Time	Location	Agenda items discussed
1.	With Construction Team Lower Site	07/01/2014	10:00	Camp office	Concrete waste management, Fire extinguishers fixing near tunnel and K. Dong, Housekeeping, car washing center required, New Batching Plant installation
2.	With Construction Team Lower Site	21/01/2014	10:00	Camp office	Entry of unauthorized people on site area, improper iron bar used instead of proper lock, Concrete material dumping, TM Slipped in powerhouse area, issued discussed, directions given to construction companies, they agreed for follow up action
3.	With Construction Team Lower Site	28/01/2014	10:00	Camp office	Miscellaneous site issues discussed and the proper management also discussed with ZK Associates, HESPAK, Kyungdong and QA/QC.
4.	With construction team and sub contractors	15/01/2014	10:00	Weir Site	During site visit HSE observed many issues regarding the lifting activities and highlighted during meeting and directives given to the construction companies
5.	With construction team and sub contractors	22/01/2014	10:00	Weir Site	Hazards on new batching plant area discussed and decisions made with consent of construction teams
6.	HSE Internal Meeting	02/02/2014	07:00	Weir Site	Safe work procedure, Safe Manual Handling and work at Height
7.	With Construction Team (L/S)	04/02/2014	10:00	Camp office	Management of concrete material, excavator operators not having driving license, damaged sign board must be repaired, Emergency lights in HRT, one more ventilator for tunnel.
8.	Construction	05/02/2014	11:00	Weir Site	Discussed all safety issues, and recommendations made.
9.	Meeting with Local Community	06/02/2014	10:00	Weir Site	Discussed all Environment issues and recommendations made.
10.	With Construction Team (L/S)	11/02/2014	10:00	Camp office	1-ZK workers not using proper PPEs, 2- Poor welding joint observed on check post, 3- Hard barricade is required on both sides of hopper, 4-All heavy equipments need hazard light, 5-Housekeeping required, 6-Wooden platform should be changed, 6-Jumbo drill working without pads, subcontractors and construction departments instructed to make corrective actions
11.	With Construction Team (U/S)	12/02/2014	11:00	Weir Site	Discussed all safety issues, and recommendations made.

Environmental & Social Monitoring Report (January-March 2014)

Sr.	Meeting	Date	Time	Location	Agenda items discussed
12.	HSE Coordination meeting with OE	13/02/2014	10:00	Camp Office Conference Room	1-Housekeeping, 2- Waste management, 3-Risk of fire, 4- Arrangement of basic welfare facilities,5- Designated smoking area on sites,6-Barricade of excavation area and sign boards & other HSE issues discussed and EPCC instructed to take these issues in consideration with priority.
13.	Police Chowki	15/02/2014	03:00	Police Chowki	Discussion about dump truck fuel & security issues.
14.	Admin Section	15/02/2014	10:00	Local Recruitment Issue	Community & EPA issue of sarati village
15.	With Construction Team (L/S)	18/02/2014	10:00	Camp Office	1-All the machinery (not in use) needs barricading, 2- Kyungdong workers not wearing PPEs in workshop, 3- Out rigger pads still not in use on site, 4- One more check wall must be used with the compressed air pipeline, 5- Charging car bucket operator should use body harness, 6- Chemical storage required on tunnel
16.	With Construction Team (U/S)	19/02/2014	11:00	Weir Site	Discussed all safety issues, and recommendations made.
17.	HSE Coordination meeting with OE	21/02/2014	10:30	Camp Office	1-Site HSE Issues i.e., Housekeeping, Cables Management, Ladder Access, Food Waste, Secure Access, Crane Pads requirement, Repairing Access Ladder, discussed with EPCC to make corrections
18.	Meeting with Local Community	22/02/2014	3:00	Police Chowki	Discussion about dump truck & water issue
19.	Kyungdong, admin and Local community	24/02/2014	11:00	Weir Site	Local community issues discussed and their solutions made in collaboration with Admin Kyungdong & Local Community
20.	With Construction Team (L/S)	25/02/2014	10:00	Camp Office Training Hall	1-ZK Workers having no proper PPEs 2- usage of damaged ropes. 3- Wheel loader without front/side lights and side mirrors, 4- Washing of excavator near river, 4-Improper fastening of pipes, 5- Electrical junction in cables, 5- MCM trucks and equipments working without hazard lights, 6- Housekeeping (Kyungdong issues)
21.	With Construction Team (U/S)	26/02/014	11:00	Weir Site	Discussed all safety issues at work place and decisions made to solve them
22.	HSE Internal Meeting	27/02/2014	11:45-12:15	Camp Office Training Hall	1-Discussion on MOM of last Audit, 2- Division of Responsibilities, 3- Permit to work enforcement

Environmental & Social Monitoring Report (January-March 2014)

Sr.	Meeting	Date	Time	Location	Agenda items discussed
					Verification, 4- Planning for Rigging Training, 5- Job Safety Analysis Revision.
23.	HSE Progress Meeting	03/03/2014	8:00	Conference Room	HSE Progress
24.	HSE Coordination meeting with OE	03/03/2014	10:00	Camp Office Training Hall	1-Lighting issues on site, 2- Resubmission of Fire prevention plan & Waste Management Plan, 3- Submission of water sample test record, 4- HRT water waste test,5- 3rd party inspection, 6- Working at height plan + permit, 40x40 cent crane rigger pads,7- Submission of JSA, 8-Provision of First Aid Box and Medicines.
25.	With Construction Team (LS)	04/03/2014	10:00	Camp Office Training Hall	1-Entry of unauthorized people on site area,2- Improper iron bar used instead of proper lock,3- Concrete material dumping,4- TM Slipped in powerhouse area, issued discussed, directions given to construction companies, they agreed for follow up action
26.	Progress Meeting	10/03/2014	8:00	Conference Room	HSE Progress
27.	With Construction Team (LS)	11/03/2014	10:00	Camp Office Training Hall	1-High Pressure pipe leakage in HRT,2- Store required for chemical storage, 3-Emergency Plan for powerhouse site light intensity at few places in HRT was less than 10 LUX, Needs to repair ventilator, 4- Wheel loader front mirror found damaged,5- Portable lights are required in HRT near the face, 6- Placement of concrete on the slope to protect the pump at batching plant and concrete is going in the river, 7- Some rent and company vehicles found near the edge of river for wash, 8- in HRT lights are required near the generator, 9- light required on access road to HRT
28.	HSE Coordination meeting with OE	14/03/2014	10:00	Camp Office Training Hall	1- Fire prevention Plan, Waste Management Plan, 2- Drinking water sample test record, 3- Dismantling plan of old batching Plant, 4- HRT waste water test, 5- Welding activity is too close to the fuel tank, 6- Fire extinguisher inspection, 7- Smoke detector installation in camp office area, 8- Working at height plan and permits, 9- Crane outriggers pads provision, 10- Submission of JSA, 11- First Aid Boxes monitoring and provision of adequate medicines, 12-

Environmental & Social Monitoring Report (January-March 2014)

Sr.	Meeting	Date	Time	Location	Agenda items discussed
					Ventilation system in HRT not fulfills the requirements and not meets the standards, 13- Portable light needs to install at face of HRT, 14- Lightning not installed especially at village entrance, lack of lighting on the access road of HRT. Light of security room is not fixed, lack of lights in explosive area, 15- Emergency lights are required at HRT, 16- Work at height plan and permits both sites, 17- Covering of sand in stock yard area at weir site, 18- Hazard lights not fixed on heavy machinery and vehicles, 19- Road slide at bridge edge (powerhouse), 20- Access road walkways should be clean and maintained on regular basis.
29.	HSE Progress Meeting	17/03/2014	8:00	Conference Room	HSE Progress
30.	With Subcontractors & Construction Team (LS)	18/03/2014	10:00	Camp Office Training Hall	1- Back filling is required,2- unauthorized person operating the girder, by the help of wheel loader crossing the access road near 2nd corner access road must repair before mucking.3- One labor was crossing the bucket to other bucket doing unsafe act.4- One labor installing bolt but without using dust mask and safety goggles.5- More lights are required during the night time activity in HRT, 6- air pressure pipes should be marked with reflected tape, 7- one more portable light should be installed at the face of HRT, 8- Kyung dong new rental dump truck 295 produce so much smoke, it increases the smoke in the tunnel during mucking time.
31.	Progress Meeting	24/03/2014	8:00	Conference Room	HSE Progress
32.	With Subcontractors & Construction Team (LS)	25/03/2014	10:00	Camp Office Training Hall	1-Parking area is required at workshop area,2- Re arrange all electric wires,3- industrial socket and hazard signs must be placed at all electric panel,4- Housekeeping is required in Kyung dong workshop area,5- Installation of new ventilator inside the HRT,6- Toilet installation in working area,7- M&E workshop needs to be fenced with steel sheets.
33.	Progress Meeting	10/03/2014	8:00	Conference Room	HSE Progress

Annex-4

HSE TRAININGS

Environmental & Social Monitoring Report (January-March 2014)

Sr. #	Training	Date	Time	Trainer	Location	Attendees	Company
1.	Confined Space Entry	02/01/2014	9:00	S. Tariq Hussain	HSE Training Hall Camp Office	12	kyung Dong
2.	Driving Safety	09/01/2014	9:00	Haroon Akhtar	HSE Training Hall Weir Site	10	Daewoo & Subcontractor Companies
3.	Defensive Driving	10/01/2014	15:00	Haroon Akhtar	HSE Training Hall Weir Site	32	Daewoo & Subcontractor Companies
4.	Safety Driving Training	11/01/2014	9:00	S. Tariq Hussain	HSE Training Hall Camp Office	08	Daewoo E&C
5.	Safety Driving Training	11/01/2014	14:00	S. Tariq Hussain	HSE Training Hall Camp Office	18	kyung Dong
6.	Welding & Cutting Training	17/01/2014	10:00	M. Javed	HSE Training Hall Weir Site	11	Daewoo & Sungbo Employees
7.	Waste Segregation awareness	22/01/2014	10:30	S. Tariq Hussain	Kyungdong Workshop	09	Kyung Dong
8.	General Safety Training	24/01/2014	7:00	S. Tariq Hussain	Workshop Area	30	Daewoo E&C
9.	Behavior Training	25/01/2014	10:00	M. Javed	HSE Training Hall Weir Site	11	Daewoo & Subcontractor Companies
10.	Emergency response training	20/02/2014	09:00	M. Javed	HSE Training Hall Weir Site	10	Daewoo E&C and All Subcontractors
11.	Awareness session on Health & Hygiene	04/02/2014	15:30	M. Javed	HSE Training Hall Weir Site	20	Daewoo E&C
12.	Lifting & work at height Training	05/02/2014	07:00	Haroon Akhtar	HSE Training Hall Weir Site	21	Sungbo C&E
13.	Scaffolding training	05/02/2014	07:00	Haroon Akhtar	HSE Training Hall Weir Site	21	Kyungdong & Sungbo C&E
14.	Awareness session on Health & Hygiene	05/02/2014	15:00	M. Javed	HSE Training Hall Weir Site	6	Daewoo E&C
15.	Work at height Training	08/02/2014	17:00	M. Javed	HSE Training Hall Weir Site	26	Sungbo C&E
16.	Working at height/lifting Training	08/02/2014	17:00	M. Javed	HSE Training Hall Weir Site	26	Daewoo E&C and Sungbo C&E
17.	General Safety	10/02/2014	10:30	S. Tariq	HSE Training Hall	15	ZK Associates

Environmental & Social Monitoring Report (January-March 2014)

	Training			Hussain	Camp Office		
18.	Permit to work training	13/02/2014	08:00	S. Tariq Hussain	HSE Training Hall Camp Office	18	Daewoo E&C, Kyungdong and ZK Associates
19.	Permit to work training	18/02/2014	07:00	S. Tariq Hussain	HSE Training Hall Camp Office	17	Daewoo E&C Batching Plant staff
20.	Educational session on LOTO system	18/02/2014	08:00	S. Tariq Hussain	HSE Training Hall Camp Office	17	Daewoo E&C Batching Plant staff
21.	Banks man Training	25/02/2014	07:00	S. Tariq Hussain	HSE Training Hall Camp Office	31	Daewoo E&C
22.	Banks man Training	25/02/2014	13:00	S. Tariq Hussain	HSE Training Hall Camp Office	13	Kyung dong & ZK Associates
23.	Flood Emergency mock drill	26/02/2014	13:00	M. Javed	All working area	160	Daewoo E&C and All Subcontractors
24.	Rigging Training	03/03/2014	8:00	S. Tariq Hussain	HSE Training Hall Camp Office	23	Daewoo & Subcontractors
25.	Supervisor training	10/03/2014	4:00	M. Javed	HSE HALL	7	Sungbo, Kyungdong & Daewoo E&C
26.	HSE Training by HSE Auditors	13/03/2014	13:00	Mr. Jang (Auditor)	HSE Training Hall Camp Office	11	Daewoo E&C (Korean Staff)
27.	Lifting/Hot work Training	15/03/2014	7:00	M. Javed	Muster Point	46	Daewoo E&C and CNEEC
28.	Scaffolding Training	19/03/2014	9:00	M. Javed	Muster Point	16	Subcontractors & Daewoo
29.	Defensive driving training	20/03/2014	7:00	S. Tariq Hussain	HSE Training Hall Camp Office	16	Drivers (Daewoo E&C)
30.	Defensive driving training	20/03/2014	8:00	S. Tariq Hussain	HSE Training Hall Camp Office	22	Drivers, Operators & Helpers (kyungdong)
31.	Awareness session on responsibilities of Construction Supervisor	20/03/2014	13:00	S. Tariq Hussain	HSE Training Hall Camp Office	11	Site Engineers & Site Supervisors (Daewoo E&C)
32.	Behavior Training	21/03/2014	11:00	M. Javed	HSE HALL	35	All staff/ workers
33.	Health, Safety & Environment Training	31/03/2014	11:00	M. Javed	Primary School Dalola	42	All Staff / Students of School

Annex-5

SAMPLE CHECKLIST & TRAINING MANUAL

DAEWOO E&C

Opposite Thuri Park lower Chatter Park Muzaffarabad AJ&K Pakistan Tel: (92) 058-2243-9498 Fax: (92) 058-2243-2657

**Summary Report of Rigging Training for Daewoo E&C Sub-contractor's
Operators, Riggers and helpers**

Dated: 3 Mar, 2014
Time: 08:00-09:00 hrs

Video about Rigging training has been played, forthcoming construction work related hazard has been pointed out and importance of **Rigging** has been explained

Training Objectives:

Review fundamentals of rigging

- the load
- the hitch
- attachments
- sling angle
- D/d ratio

General use guidelines

- Rigging - Plan
- Who is responsible for the rigging?
- Is the equipment in safe condition?
- Are the working load limits adequate?
- Will the load be under control?
- Are there any unusual loading or environmental conditions?

Rigging Basics

- Load weight shall be within rated capacity of the sling* ASME 830.9
- Load weight may be obtained from:
 - equipment nameplate
 - packing list
 - drawings
 - shipping tag
 - weighing the load
 - an estimate or calculation of load weight

Load information :

- Size
- Weight
- Center of gravity
- Rigging Basics - The Load
- Size
- Weight
- Center of gravity

DAEWOOE&C

Opposite Thurl Park Lower Chatter Park Muzaffarebad AJ&K Pakistan Tel: (92) 058-2243-9499 Fax: (92) 058-2243-2657

Hitches

- Vertical – having the load suspended vertically on a single part or leg of the sling.
- Basket – loading with the sling passed under the load and both ends on the hook, master link, or lifting device
- Choker – bading with the sling passed through one eye or choker hook and suspended by the other end
- Choke angle – the angle formed between the load line and the noose
- Do not confuse choke angle with angle of inclination of the load
- Double Wrap Basket Hitch
- adjustment of slings is required while taking up slack to avoid overloading one side of the sling (this applies to all basket hitches)
- Turning loads with a choker hitch

Sling Angle

- Sling angle has a dramatic effect on the actual load on the sling. Take a sling that has a 1000 pound vertical lifting capacity in a basket hitch:
- As angle decreases - tension on each leg increases - increasing the strain on each leg
- The sling angle factor equals H divided by L, the inverse, $\frac{L}{H}$, can also be used to calculate sling load

D/d Ratio

- D/d ratio is the ratio of the diameter around which the sling is bent divided by the body diameter of the sling. Whenever a sling body is bent around a diameter, the strength of the sling is decreased.

Sockets

- swaged and poured socket assemblies shall be proof tested
- mechanical splice single vertical leg slings test shall be 2 times vertical load limit

Shackles

- used only those rated for overhead lifting
- synthetic web slings connected to shackles of sufficient size to not cause bunching or pinching of the sling

Hooks – inspect before use, use ASME 830.10 or a recognized Engineering Standard

- Hooks - avoid eccentric loading of hooks
- do not exceed 90 degrees included angle when connecting two slings in a hook. If you have an included angle more than 90 degrees, or more than two legs, use a shackle or a master link to connect.
- Turnbuckles
- Turnbuckles can be used to adjust sling length. Be sure to use only load rated components
- Eye bolts
- use only forged eye bolts rated for lifting
- never use if damaged, bent, elongated
- never use regular eye bolts for angular lifts
- always seat shoulder against the load
- Eye bolts

V DAEWOOE&C

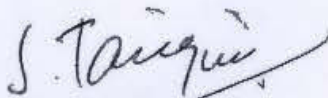
Opposite Thuri Park Lower Chatter Park Muzaffarabad AJ&K Pakistan Tel: (92) 058-2243-9498 Fax: (92) 058-2243-2657

- always shirn eye bolts to seat shoulder in-line for angular loading
- for angular lifts reduce working load
- 45 degrees - 30% of rated working load
- 90 degrees - 25% of rated working load

Eye bolt - Rigging Attachments

- Spreader beam - A below-the-hook lifting device that utilizes two or more hooks (attaching devices) located along a beam and the spreader beam attaches to the hoist by means of a bail. The spreader beam is used to handle long or wide load and serves to "spread" the load over more than one lifting point. Often used in conjunction with slings.
- Pre-use and periodic inspection is required on all sling and rigging components
- Rigging equipment shall not be loaded beyond its recommended working load limit (WLL)
- When not in use, rigging shall be removed from work area and properly stored
- During lifting, personnel shall be alert for possible snagging
- Slings should be long enough so that rated load is adequate
- Multiple leg slings shall be selected so as not to introduce into the leg, a load greater than permitted
- Shock loading should be avoided
- The load shall be applied to the center of the hook (unless the hook is designed for point loading)
- When used in a choker hitch, prevent the load on any portion of the sling from exceeding the rated load
- Slings shall not be shortened by knotting or twisting
- Slings should not be pulled from under a load when the load is resting on the sling
- Slings should not be dragged on the floor
- Sharp corners in contact with the sling should be padded
- Do not place body, fingers, etc. between the sling and load or hook
- Personnel shall not ride the sling (or load)
- Personnel should stand clear of suspended load
- And not "Be" the suspended load!!
- No Homemade Slings

anyquestion



Syed Tariq Hussain
HSE Trainer



Chung Myung Hun
HSE Manager

Annex-6

EMP COMPLIANCE STATUS

Environmental & Social Monitoring Report (January-March 2014)

FEATURE / ISSUE	PARAMETER/S MONITORED	LOCATION	Actions Taken and Monitoring Results	Detailed Report
Landslides	Slope Stability Crack on the slope Water from the slope	Both sides with in the project vicinity	Landslide monitoring will be carried out during current year. However, measures like rock bolt, Shotcrete on surge shaft slopes and sand trap area undertaken before work was closed due to design issues. Furthermore, cut off drain over surge shaft slopes were constructed. Civil works on surge shaft slope had already been closed due to design issue.	To be reported during current year after proposed monitoring After monsoon
Vegetation Clearance	Progressive vegetation clearance within marked sites	Powerhouse site and within acquired land.	Clearance of shrubs at limited scale from already marked area undertaken. No additional clearance occurred.	Monitoring undertaken. Summary of vegetation study presented as (Annex-10)
Erosion and Sediment	Slope protection Slope drainage system Sedimentation ponds	Both sites but sedimentation pond on upper site	Surge shaft slopes and sliding areas were covered with polythene membrane sheets, on surge shaft access area. Shotcrete activity was undertaken on both sides.	None
Muck Disposal	Reuse where possible	Both sites	disposal areas and back filling of embankment (wire mesh gabion walls)	Current status is given in Section H of main report as” Plan for disposal of Excavated Waste Material “
Water Quality	Wastewater treated prior to river discharge Monitoring items in the EMP	Both sites (Tunnel waste water, Batching plant concrete waste water and camp site sewerage.	Treatment being undertaken through sedimentation tanks Quality monitoring undertaken in quarter.	Annex-8 (Summary of Water Quality Monitoring Report)

Environmental & Social Monitoring Report (January-March 2014)

Waste Management	Non-recyclable wastes disposed of appropriately	Camp sites and construction sites	Non-recyclable empty containers of Naphthaplast F 707L being send back to manufacturer.	Current status is given in Section H of main report as “ Waste Management Plan”
Aquatic Ecology	Fish and Aquatic populations	Up and down stream Kunhar River	Monitoring undertaken	Annex-9-Summary of Fish Fauna Monitoring
Flora	Direct observation of surrounding vegetation	Both sites of the Project	Monitoring undertaken during quarter	Annex-10- Summary of Vegetation Monitoring
Noise and Vibration	Maintenance of equipment Controlled blasting	Power house site, HRT, Weir site.	Regular inspections of heavy equipment and maintenance at workshop	Annex-2
Air Quality	Exhaust emissions from machinery- visual inspection	All heavy equipments and machinery on both sites.	No third party monitoring, however, regular inspections by HSE engineers.	Annex-2 Inspections

Environmental & Social Monitoring Report (January-March 2014)

Traffic/Access	Enforcement of speed limits Noise Traffic signs	Project area and access roads	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.	Current status is given in Section H of main report as “ Plan for traffic management”
Spring Water	Water Quantity Drinking water quality monitoring items	Project sites and surrounding villages	Quality Monitoring completed in reporting quarter.	Annex-8 Summary of Water Quality Monitoring Report
Complaints	All complaints	Project employees and adjacent communities	Internal GRC established to address employee issue. No complaint received directly received during quarter. A compliant from Patrind Action Committee regarding local employment received through ADB.	Detailed response including Company HR policy and local employment status had already been sent to the Lenders

Annex-7

MCM DISPOSAL SITE VISIT

MCM Waste Disposal Area- Site Visit Note

On March 27, 2014 a team comprising EPCC's HSE Manager, HSE Engineer and HSE Environmental Inspector conducted visit of landfill site operated by a government corporation i.e. Municipal Corporation of Muzaffarabad (MCM) as its final disposal facility. The observations made and data collected from site is given below;

Disposal Facility Type: Landfill
Disposal Facility Location: Zaminabad / Sahdara
Distance from project site: 25Km
Disposal Area: 58 Kanal 9 Marla

Observations/Findings:

Following observations were made during site visit of MCM's landfill site;

Sr. No	Observation	Compliance	Non Compliance
1.	Distance from residential areas	✓	
2.	Proper Access to disposal area	✓	
3.	Distance from water bodies		✓ Site is located adjacent to River Jhelum
4.	Site stability	✓	
5.	Open dumping	Partial compliance as open dumping was also observed at one corner of the site	
6.	Land filling	✓	
7.	Leaching prevention		✓ Not appropriately designed (placement of geotex or polysynthetic sheets and embankment) as substances could move with rain water towards the river.
8.	Waste transporting vehicle covered	✓	
9.	Compaction of soil cover	✓	

Furthermore, during visit transportation through MCM trucks was also witnessed by the team and trucks drivers and site supervisors were also interviewed to get more information. AS per their statements with few exception mostly waste is dumped and simultaneously covered with soil and compacted using excavator which is always available on site.

MCM Office Muzaffarabad:

As per record and information received from Chief Officer Municipal Corporation, site was selected by a competent committee using an environmental checklist. After earthquake 2005 as part of reconstruction activity under a development scheme site was acquired and designated as municipal waste disposal area. MoU made with MCM is placed below:

Original Copy

DAEWOO E&C
Daewoo main Camp Office, Lower Chatter
Near Thuri Park, Muzaffarabad, AJ&K
Tel:05822-439498 Fax:05822-432657

Date: Dec31, 2013

MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding (MOU) is made and entered into at Muzaffarabad on December 31, 2013

BY AND BETWEEN
The Municipal Corporation Muzaffarabad (MCM), a Government Department
AND
Daewoo Engineering and Construction Company (Daewoo E&C), having an office in Muzaffarabad, a construction company working on Pakistan Patrind Hydropower Project.
Each of the two parties, hereinafter, shall be referred to individually as "Party" and collectively as "Parties"

WHEREAS:

- 1- The Municipal Corporation Muzaffarabad is ready and willing to provide garbage collection services ("Services") to the Daewoo E&C to its Office on Tri Weekly Basis (Monday, Wednesday & Saturday).
- 2- The Daewoo E&C is ready and willing to avail the services and
- 3- The Parties wish to enter into this MOU to set out here under the preliminary terms and conditions upon which the Municipal Corporation Muzaffarabad will provide services to Daewoo E&C.

NOW THEREFORE, in consideration of the premises and subject to the terms and conditions hereinafter set forth, the parties through this MOU do hereby mutually agree as follows:

A. DURATION OF MOU:
This MOU shall be concluded for a period of One (1) year from 1st of January 2014 to 31st of December 2014. The MOU shall be renewed in writing for the same duration, unless one party gives notice of termination at least two months prior to the expiry of terms in progress.

B. GARBAGE COLLECTION:
Municipal Corporation Muzaffarabad is responsible to collect the garbage from collection point near Daewoo E&C Office in Lower Chatter Thuri and dispose of at Shahdra Garbage Disposal Point.

C. GARBAGE DISPOSE OFF:
Municipal Corporation Muzaffarabad has its own garbage disposal point at Shahdra (near Chatter Class). Similar to the other offices and organizations, the waste collected from the Daewoo E&C will be disposed of at Shahdra.

D. VISITING HOURS:
The Municipal Corporation Muzaffarabad will collect the garbage on aforementioned days on triweekly basis from Daewoo E&C premises during working hours from 0700 hrs to 1800 hrs, Municipal Corporation Muzaffarabad employees will have to show the office card before entering Daewoo E&C premises.

DAEWOO E&C

Daewoo main camp office, Lower Chatter
Near Thori park, Muzaffarabad, AJ&K
Tel: 05822-439498 Fax: 05822-432657

Date: Dec 31, 2013

A. BILLING AND MODE OF PAYMENT:

The monthly Services Charges are fixed at PKR12, 000/- (Rupees Twelve Thousand Only), after reception of invoice payable every month by crossed Cheque to the Municipal Corporation Muzaffarabad. There shall be no increase in the fixed amount (PKR 12,000/-) during the year. All waste material, labor and transportation cost will be solely born by Municipal Corporation Muzaffarabad.

B. CORRESPONDENCE:

All notices, letters and other communications required by this MOU shall be in writing and shall be deemed to have been communicated when delivered by courier or by hand to the designated representative of the parties at the addressed specified below.

Designated representative of the MCM

Designated representative of Daewoo E&C

Municipal Corporation Muzaffarabad (MCM)
Upper Adda
Muzaffarabad

Lower Chatter Thuri
Muzaffarabad



II- DIPLOMATIC CLAUSE:

Daewoo E&C expressly reserves the right to terminate the present lease upon one month's notice if it should have to leave Pakistan or to reduce its support activities.

For the MCM

For the Daewoo E&C

Syed Qamar Abbas
(Chief Officer)

Mr. Kim Jin Myeong
(General Manger Admin)

Chief Officer
Municipal Corporation
Place, date Muzaffarabad (A.K)

Place, date Muzaffarabad A.K

Witness:

Witness:

Signature of Syed Qamar Abbas
- سید قمر عباس

Signature of Muhammad Aftab Alam
HSE Manager
Fairwind Hydropower PJ.

Annex-8

WATER QUALITY MONITORING

Executive Summary

A team comprising of technical experts from IVA-pure, EDA officials and Patreend Hydro Power project staff was assigned in order to carry out field survey and collect water samples from identified water sources being used by the local community for drinking purposes and other domestic needs. External technicians with the assistance of Project staff collected the samples from identified sites according to the standard procedures.

None of the water spring was found protected with proper storage structure during on site field visit. The water springs are exposed to external pollution and contamination due to natural and anthropogenic activities.

Coliforms are useful indicators of possible presence of pathogenic bacteria and viruses. Coliforms is found in all the samples collected except those from Lower Alra village, Alra west, Didal lower disposal site and Hunobi New Batching Plant site. The presence of the bacteria (Coliforms, Total) in the analyzed samples indicates that the water is not potable due to contamination.

On the basis of onsite observations and laboratory investigations following recommendations are suggested:

Drinking water

- The springs should be protected at the point where water leaves the ground to avoid the external contamination. Since most of the springs are generally located on the hills or ravines, therefore a simple gravity flow delivery system can be installed which is relatively maintenance free and easy to construct with enough storage capacity. **Spring Box** method is the appropriate model to protect the spring as drinking water source for community water supply on such sites.
- A quality disinfection unit is recommended after installation of spring protection.
- Routine water quality surveillance is vital to ensure that water for human consumption is free from all kind of contamination and pollution.
- Qualitative and quantitative measurements are needed from time to time to constantly monitor the quality of water at every source of supply.

Sewage/Waste water

- Releasing of raw sewage into the river without treatment may results in contamination of water with pathogen (disease causing bacteria) thus affecting the aquatic life. The effect may be a decrease in dissolved oxygen because of the increase in bacteria that breakdown the waste and use up oxygen in process. A decrease in dissolved oxygen would affect aquatic species such as fish and micro invertebrates. Therefore, before releasing raw sewage into the main river stream, it is advisable to construct septic tanks for treatment of raw sewage.
- The waste water from HRT sites, before discharge to receiving stream/ river, must be treated. The chemical, microbiological contaminants and other pollutants should be removed prior to river or stream discharge in order to protect downstream users of river water and aquatic life.

It must be appreciated that sediment filtration tanks are constructed for the waste water treatment at the batching plant lower site.

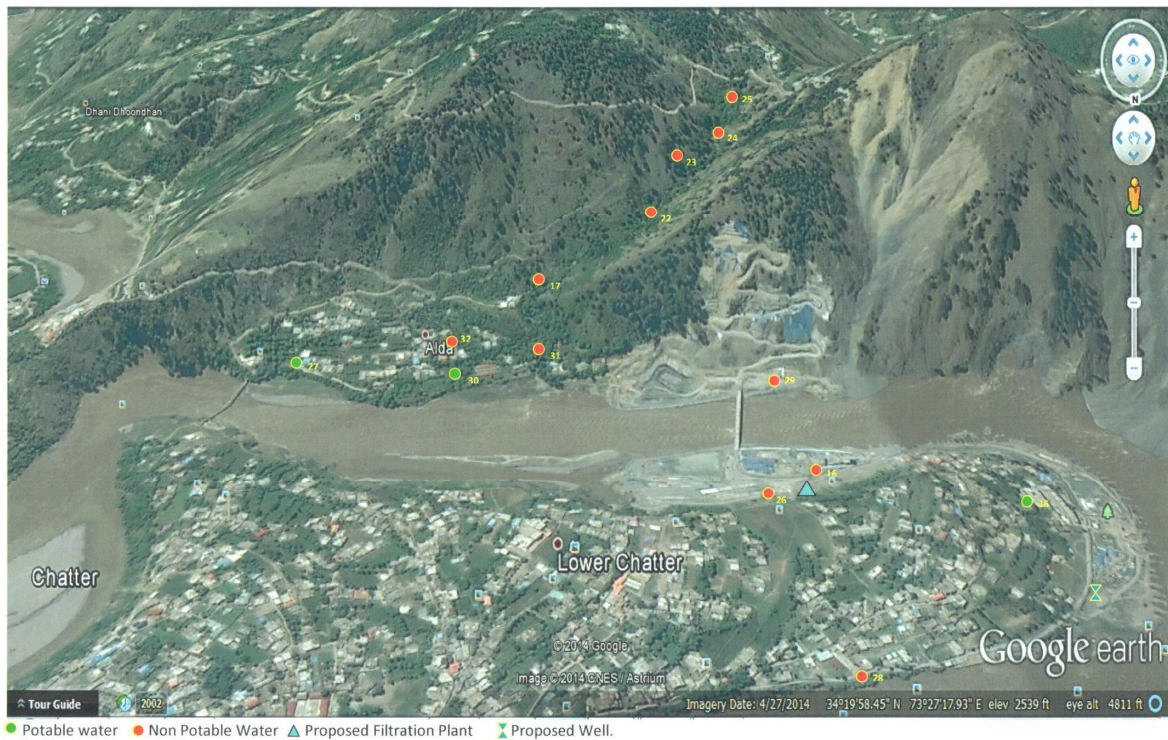
Hope this report will provide a way forward for appropriate decision making purposes and further required measures.

SAMPLING LOCATIONS

WEIR SITE



POWERHOUSE SITE



Test Report Abstract

S. #	Ref	Location	Water Type	Water Quality
1	EDA-001	Patreend village Upper	Drinking water	Unsafe/Non Potable due to presence of Coliforms
2	EDA-002	Patreend stream	Drinking water	Safe/Potable
3	EDA-003	Tatri village	Drinking water	Unsafe/Non Potable due to presence of Coliforms
4	EDA-004	Didal Lower Disposal Area	Drinking water	Safe/Potable
5	EDA-005	Tatteri Village Upper	Drinking water	Unsafe/Non Potable due to presence of Coliforms
6	EDA-006	Hunobi New Batching Plant	Drinking water	Safe/Potable
7	EDA-007	Hundi Main Source	Drinking water	Unsafe/Non Potable due to presence of Coliforms
8	EDA-008	Hudi Main Source II	Drinking water	Unsafe/Non Potable due to presence of Coliforms
9	EDA-009	Patreend Lower	Drinking water	Unsafe/Non Potable due to presence of Coliforms
10	EDA-010	Tarcheela Upper	Drinking water	Unsafe/Non Potable due to presence of Coliforms
11	EDA-011	Tarcheela Lower	Drinking water	Unsafe/Non Potable due to presence of Coliforms
12	EDA-012	Cafer Dam	Drinking water	Unsafe/Non Potable due to presence of Coliforms
13	EDA-013	Sarati Tank	Drinking water	Unsafe/Non Potable due to presence of Coliforms
14	EDA-014	Rehman Abad	Drinking water	Unsafe/Non Potable due to presence of Coliforms
15	EDA-015	Camp Office Water Tank	Drinking water	After Sediment Treatment Safe/Potable

Environmental & Social Monitoring Report (January-March 2014)

S. #	Ref	Location	Water Type	Water Quality
16	EDA-016	Batching Plant Pit Left Lower Site	Drinking water	Unsafe/Non Potable due to presence of Coliforms
17	EDA-017	Alra Main Tank Source	Drinking water	Unsafe/Non Potable due to presence of Coliforms
18	EDA-018	River upstream right Bank	River water	Turbid, Unsafe/Non Potable
19	EDA-019	River upstream left Bank	River water	Turbid, Unsafe/Non Potable
20	EDA-020	River downstream right Bank	River water	Turbid, Unsafe/Non Potable
21	EDA-021	River downstream left Bank	River water	Turbid, Unsafe/Non Potable
22	EDA-022	Alra Mini Tank Source	Drinking water	Unsafe/Non Potable due to presence of Coliforms
23	EDA-023	Upper Alra Tank Storage	Drinking water	Unsafe/Non Potable due to presence of Coliforms
24	EDA-024	Mini Tank Storage Alra West	Drinking water	Unsafe/Non Potable due to presence of Coliforms
25	EDA-025	Galari Tank	Drinking water	Unsafe/Non Potable due to presence of Coliforms
26	EDA-026	Spring New Batching Plant Lower Site	Drinking water	Unsafe/Non Potable due to presence of Coliforms
27	EDA-027	Lower Alra A	Drinking water	Safe/Potable
28	EDA-028	Spring Thori at Project Entrance	Drinking water	Unsafe/Non Potable due to presence of Coliforms
29	EDA-029	Well Right Bank Lower Site	Drinking water	Unsafe/Non Potable due to presence of Coliforms
30	EDA-030	Alra West	Drinking water	Safe/Potable
31	EDA-031	Lower Gali Spring	Drinking water	Unsafe/Non Potable due to presence of Coliforms

Environmental & Social Monitoring Report (January-March 2014)

S. #	Ref	Location	Water Type	Water Quality
32	EDA-032	Alra Reservoir inside village	Drinking water	Unsafe/Non Potable due to presence of Coliforms
33	EDA-033	Kanhar River downstream right Bank	River water	Turbid, Unsafe/Non Potable
34	EDA-034	Kanhar River downstream left Bank	River water	Turbid, Unsafe/Non Potable
35	EDA-035	Kanhar River upstream left Bank	River water	Turbid, Unsafe/Non Potable
36	EDA-036	Kanhar River upstream right Bank	River water	Turbid, Unsafe/Non Potable
37	EDA-037	Camp Site Sewerage Waste	Sewerage water	Raw Sewerage
38	EDA-038	HRT Main Tunnel Waste upper site before River Discharge	Waste water	Water is highly contaminated with difference kind of suspended particles
39	EDA-039	HRT Main Tunnel Waste Upper site	Waste water	Water is highly contaminated with difference kind of suspended particles
40	EDA-040	HRT Waste Lower Site Tunnel	Waste water	Water is highly contaminated with difference kind of suspended particles
41	EDA-041	HRT Waste Tank	Waste water	Water is highly contaminated with difference kind of suspended particles
42	EDA-042	Batching Plant Waste Untreated	Waste water	Water is highly contaminated with difference kind of suspended particles
43	EDA-043	Batching Plant Waste Treated	Waste water	Cloudy with slight concentration of suspended particles
44	EDA-044	HRT Waste at River Discharge point Lower site	Waste water	Water is highly contaminated with difference kind of suspended particles



Water Quality Testing Section

WATER QUALITY TEST REPORT

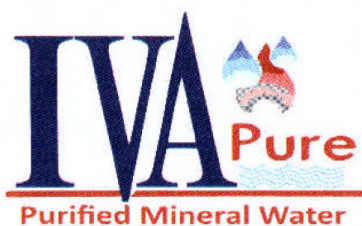
Ref #: EDA – 002

SAMPLING DETAIL			
Client Name & Address	Patrind Hydro Power Project Muzaffarabad		
Sampling Source	Patrind Stream		
Sampling Date	22-03-2014	Sampling Time	11:35 AM
Sample Receipt Date	24-03-2014	Reporting Date	07-04-2014
Date(s) of Analysis	24-03-2014		

WEATHER CONDITIONS & FIELD OBSERVATIONS	Now	Past 24 hours	Has there been a heavy rain in the last 7 days?
	<input type="checkbox"/> storm (heavy rain) <input type="checkbox"/> rain (steady rain) <input type="checkbox"/> showers (intermittent) 40% <input type="checkbox"/> %cloud cover <input checked="" type="checkbox"/> clean/sunny	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> ____% <input type="checkbox"/> Other	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Air Temperature 22 °C.

PHYSICAL & AESTHETIC PARAMETERS					
S#	Water Quality Parameter	Unit	Permissible Limits (PSQCA, 2008)	Results	Remarks
1.	Color	-	Colorless	Colorless	
2.	Odor	-	Odorless	Odorless	
3.	Taste	-	Tasteless/Unobjectionable	Tasteless	
4.	Electrical Conductivity	(µS/cm)	NGVS	730	
5.	pH	-	6.5-8.5	7.98	
6.	Turbidity	NTU	<5	6.9	Slightly above the limit
7.	Temperature	-		17°C	

MAJOR CHEMICAL PARAMETERS					
S#	Water Quality Parameter	Unit	Permissible Limits (PSQCA, 2008)	Results	Remarks
8.	Alkalinity	mg/L	500	158	
9.	Calcium	mg Ca/L	200.00	190	
10.	Chloride	Mg Cl/L	250	44	
11.	Total Hardness	mg/L	500	280	
12.	Magnesium	mg Mg/L	150	57	
13.	Potassium	mg K/L	100	33	
14.	Sodium	mg Na/L	200	61	
15.	Sulfate	mg So ₄ /L	200	43	
16.	Nitrate (N)	mg No ₃ /L	10 (≅ 44.2mg/L Nitrate as Nitrate (No ₃) (USEPA)	2.9	
17.	TDS	mg/L	1000	391	
18.	Chlorine	mg/L	0.3	Nil	
19.	Floride	mg F/L	1.5	0.0	
20.	Iron Total	mg Fe/L	0.3	0.01	



Water Quality Testing Section

MICROBIOLOGICAL ANALYSIS					
S#	Parameter	Unit	Permissible Limits	Results	Remarks
21.	Total Coliforms	Count/MPN/100ml	-ve (Nil)	-ive	Safe
22.	Fecal Coliforms	Count/MPN/100ml	-ve (Nil)	-ive	Safe
23.	E. Coli	Count/MPN/100ml	-ve (Nil)		

Quality of Water: Safe/Potable.

BDL: Below Detection Limit

WHO: World Health Organization

MPN: Most Probable Number

USEPA: United States Environmental Protection Agency

NGVS: No Guidance Value Set

APHA: American Public Health Association

PSQCA: Pakistan Standard Quality Control Authority

REMEDIAL MEASURES FOR BACTERIAL CONTAMINATION:

Boiling of water, Chlorination, Solar Disinfection and use of Lemon Juice are recommended for safe bacterial free drinking water.

WATER TREATMENT:

- Flocculation:** Addition of lime to make water slightly alkaline.
- Coagulation:** Addition of coagulants like Alum (Aluminium Sulphate), Ferric Sulphate or Ferric Chloride.
- Sedimentation and Filtration followed by disinfection.

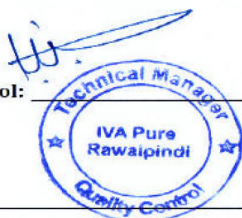
Use Alternate source if hardness increased by seasonal effect due to anthropogenic activities.

TERMS & CONDITIONS:

- Test results in this report relate to the test item/sample submitted and tested. The result analysis report is accurate and authentic only for the parameter tested and in case of any divergence of report the findings of the lab will be considered valid and final.
- The test report shall not be reproduced except in full, without written approval of IVA-Pure.
- Water Quality Parameters exceeding the WHO Drinking Water Guideline value (Guidelines for Drinking – Water Quality, third editions, 2004) National Environmental Quality Standards (1999) and Pakistan Standard Quality Control Authority (PAKEPA, 2008) are highlighted.
- Report is not valid for any court proceedings.

Technical Manager Quality Control:

EDA-002



Bio Chemist:

Bio chemist
Water Quality Testing Unit
IVA Pure Rawalpindi

Annex-9

SUMMARY OF FISH FAUNA STUDY

147 MW PATRIND HYDROPOWER PROJECT



Study & Monitoring of Fish Fauna of Kunhar River

January – March 2014

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1. Abstract

Fish fauna form an integral part of aquatic ecosystems, and any changes in their habitat can affect their productivity, diversity and distributions. In order to assess the current status of the fish fauna of the river Kunhar, 1st study was undertaken in September 2013 and this is the 2nd study at the same points. Samplings were carried out at the six study points; four downstream- Boi, Domel Boi, Parri and Outlet of River Diversion and 2 Upstream of Weir – Inlet of River Diversion and Tarchela covering a total river length of about 10 km.

Kunhar river fish is limited to few species because of its year round low temperature. The temperature goes up to 17 degrees Centigrade maximum during three months of the year i.e., July, August and September. The fish found here other than the trout have very low economic value as their growth is very low and small. Fish have many small lateral spines due to which people mostly hesitate to consume it. Exotic brown trout is common in the upper reaches of the river Kunhar and established self-reproducing populations. Government of Khyber Pakhtoon Khawa has established hatcheries for the production of rainbow trout. At present sufficient seed is claimed to be available for further expansion in the still small private sector producing table-size rainbow trout. There is no system of artificially breeding the natural fish fauna of river Kunhar. Indigenous fish, mainly Schizothoracine carps support an unknown level of subsistence fishery. The famous game fish Mahseer (*Tor tor*, *Tor putitora*) and Schizothoracines are becoming rare due to overfishing and the disappearance of spawning grounds destroyed by the floods and now threatened by reservoir of the Patrind project. Impact will not be significant as Mahseer fish has not been caught from the river Kunhar for the last 10 years (Depicted from the interviews of the locals). Their artificial production in hatchery conditions has not been done and is yet to be initiated. At present, all coldwater fishery development effort concentrates on rainbow trout production for markets and on maintaining healthy stocks of brown trout in streams and rivers for anglers.

2.0 Materials and Methods

2.1 Study area

The Kaghan valley is mainly drained by river Kunhar and its tributaries and has passed through various geological successions ranging from the oldest Archean to the recent Alluvium.

Kunhar, the river of Kaghan Valley, originates from the higher reaches of Kaghan form Babusar, Lalusar Lake which are the parts of Giant Himalayas. Kunhar River flows through Kaghan valley. It has a length of 129 km up to weir site (755 m amsl). It is spread over a catchment area of 2,429 Km². The 13 Km reach of the Kunhar River from weir site to its confluence with Jhelum River at Domishahi has a catchment area of 256 Km². On its course through the valley, it carries the waters of a host of streams that flow down from the

bordering mountain slopes. Unfortunately, all along its course through the valley of Kaghan, the river is loaded with large quantities of sewage and agricultural runoff from the catchment.

2.1 Study sites

Total six study sites were studied to assess the difference from the last study and know the impact of various factors on the fish fauna of river Kunhar at present. In order to assess the current status of the fish fauna of the river Kunhar, first study was undertaken in September, 2013 and this is the 2nd study at the same sampling points selected in first study in March 2014. Samplings were carried out at the six study points, four downstream- Boi, Domel Boi, Parri and Outlet of River Diversion and 2 Upstream of Weir – Inlet of River Diversion and Tarchilla covering a total river length of about 10 km.

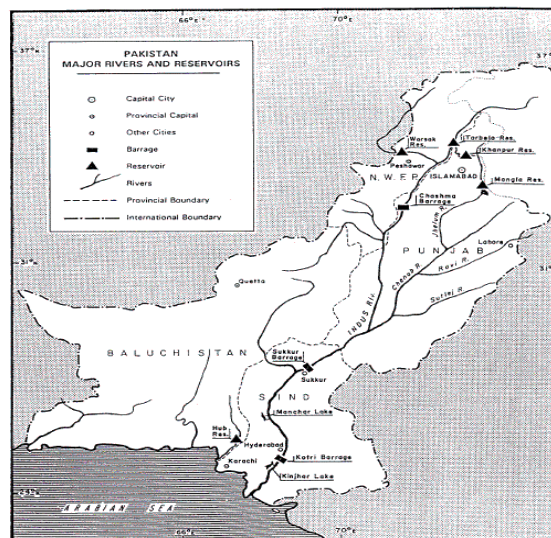


Fig. 1. Pakistan: location of major reservoirs

2.2 Methods

Fish specimens were collected from all six the points starting in the morning. Two professional fishermen, Muhammad Haneef Qureshi of Tarcheela Village and Naseer Ahmad of Dalola were hired for catching the fish specimen. The fishermen used indigenous method of cast net for fishing. The specimens were preserved in 10% formalin and brought to the laboratory for further studies. Fish specimens were identified with the help of the standard taxonomic works (Kullander)



Mr. Naseer Ahmad, Fisherman



Mr. Muhammad Haneef Qureshi, Fisherman

2. Fish Study

Fish study was carried out at 6 pockets of the Kunhar River with a stretch of about 50 meters each at 10 km up and down stream of the Patrind Weir point.



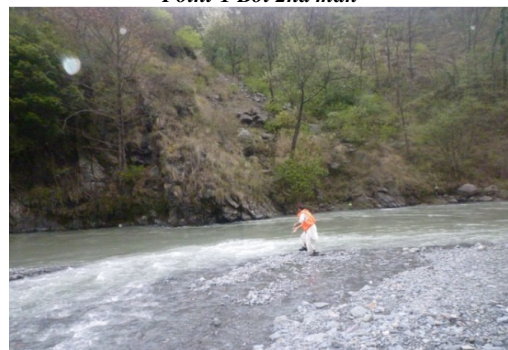
Point-1 Boi



Point-1 Boi 2nd man



Point-2. Near the Atshal Bridge



*Point-2 at Domel Boi,
the confluence of Nalla Boi*



Study and monitoring team members



Point-3, Parri



Point 4 Outlet of the diversion Tunnel



Point-5 Inlet of the diversion tunnel



Diversion Tunnel-Inlet



Point-6: Tarcilla

3. Field Results

Point-1 (Boi)

This is the point situated at 34° 18' 19" N, 73° 26' 44" E at 723 meters of elevation above sea level. No fish could be caught from this point which shows the following possibilities:

Time duration

Temperature of the water which was 13°C at the time of the year study was undertaken i.e., month of March which is considered as comparatively low catch time. Change in the water flow and water quality due to the construction of dam. Last time 3 fish were netted during the 2 hours of spell from this point with a weight of 168, 36 and 52 grams respectively. The only species was *Schizothorax curvifrons* (snow trout)

Point-2 (Domel Boi)

This is the point situated at 34° 18' 36" N, 73° 26' 43" E at 736 meters of elevation above sea level. This spot has a tremendous potential of fish production but most probably, due to heavy fishing pressure, the fish concentration observed to be very low. Again no fish could be caught in spite of 2 hours try by the fishermen. Last time 4 small size fish were netted from the confluence and below it, but no fish was caught above this point.

Point-3: (Parri)

This is the point situated at 34° 19' 47" N, 73° 25' 35" E at 750 meters of elevation above sea level. This is again a good fishing point situated at about 3 km downstream of Patrind weir point. A very small creek with comparatively higher water temperature joins the river here providing chances of abundant food for fish. Two fishermen took 2 hours to catch one small fish of 62 gram fish which was *Schizothorax plagiostomus* and a comparatively large fish of 120 grams. All the fish caught were snow trout only.



Point 4: (Outlet of river diversion)

This is the point situated at 34° 18' 19" N, 73° 26' 44" E at 766 meters of elevation above sea level. This is the outlet of the diversion tunnel. No fish, as expected, could be caught as the flow of the river water is very fast. This diversion tunnel has a definite impact on the fish production but to maximum of 800 meters downstream. Then the river makes pools to provide breeding ground to the fish.

Point-5: (Inlet of river diversion)

This is the point situated at 34° 20' 16" N, 73° 25' 26" E at 772 meters of elevation above sea level. This is the inlet of the diversion tunnel making a small lake type of water body providing opportunity to the fish to make home ground. At this part of the year (March 2014), new weir house is near to its completion and this diversion will be closed soon when the water lake will appear due to check in its flow. This will show a great impact on the fish may be the size of the fish, species combination and species change is also possible. Water temperature will also increase to some extent providing opportunity to other native fish species like *Labeo*

rohita (Rohu), *Cyprinus carpio* (Gulfam) and to some extent brown and rainbow trout. After construction of the lake of Patrind weir, it can serve as breeding ground for the Rainbow and Brown trout. If carefully planned, this can become commercial activity but needs expert input. no fish could be caught from here like the previous study. Only one fish of small size was netted last time. The species adapted to stagnant water conditions will dominate and survive better at this point.

Point-6 (Tarchela)

This is the point situated at 34° 18/ 19" N, 73° 26/ 44" E at 776 meters of elevation above sea level. This is a point of zero water level of the expected lake. The fish population is low as per sampling of continuous 3 hours netting. Two fish of species, *Schizothorax plagiostomus* and one *S. curvifrons* (Snow Trout) were caught of very small size. This will have little impact by the construction of dam but better understanding could be done during the month of June.

4. Water Quality Sampling

The water samples were also collected at all 6 selected sites and analyzed for temperature (°C), pH, and dissolved oxygen. Water quality was found conducive to fish culture except for turbidity and critical temperature regime for cold water fish.

Water temperature at points 1 was 13°C +5% with dissolved oxygen level of 8.1 -8.2. Air temperature was 15.5°C and pH of 6.3.

Water temperature at point 2 was 14.8°C and points 3-6 were 11.8°C +5% with dissolved oxygen of 8.3 and pH 6.3.

The rain started during the netting time but river water remained clear so the water turbidity was recorded low.

5. Impacts and Mitigation Measures

The fish number caught at six points was only 3 which show a significant decline of the fishery resource of the River Kunhar over a period of time indicating some stress.

The downstream impact seems to be higher due water diversion. Breeding grounds will be changed altogether even with the release of minimum 2 cumecs of water. Since the fish population is already low in the river, most likely by the heavy floods of 1992 and the 2010, therefore the Impact of construction and operation activities on the economical fish fauna would be insignificant.

Minimum 2 cumecs of water from the head pond will be released as ecological flow throughout the year. This flow (2 cumecs) is in addition to the flow which joins Kunhar River in the form of various large and small streams downstream of the weir thus providing mitigation measures for aquatic flora and fauna in the reach downstream of the weir.

The head lake will hold a considerable fishery potential after the construction of the dam. Appropriate management of fisheries potential can be achieved if Inputs from the fishery expert are taken, which can lead

to a big economic activity. Fish fauna combination will definitely be changed but it will not have a serious impact on the larger area of the river Kunhar.

6. Local Knowledge

The local knowledge on fishery in river Kunhar has been observed very low mostly because the minimum consumption of the fish by people. Very few professionals are involved in the netting. Fishing gears used are cast nets, gill nets, rod and line. Illegal means of fishing like use of explosives, poisoning and electric currents are also reported in the area especially few years back when the fish population was comparatively high in the river. It was considered through the discussion with the locals that professional fishery is almost negligible in the Project area. When asked about the cause of the less fish population in the river, 90% reply was 'due to heavy floods'. 5% also held responsible the use of explosives and electric current at some places 3% did not reply and 2% told the cause of the construction of Patrind Project.

The fishing is mostly done in winter just because the fish demand is higher during these months with the concept of hot impact of the fish and also due to lower turbidity, low speed and depth of the river water.

When asked about the availability of trout, the answer of majority of the public was no with occasional evidences of trout availability in the Project area after many years. They revealed that the Trout was restricted mainly above the Balakot area of KPK.

7. The Evidence Supports The Findings of the Fish Fauna Survey

The professional fishermen were also interviewed. According to them, the floods have damaged the fish and due to low rate of growth in local snow trout fish, the edible fish is no longer available in the area. Sometimes, with a good fortune they find brown trout paying them good return sold to the rich people. Kunhar River Fish is not sold in any market of the area.

8. Study of Fish Fauna

The fish fauna of water bodies located in the areas under Pakistan is known through a number of comparatively recent studies conducted at different places and times (Mirza, 1975, 1978, 1980, 1990, 2003, Rafique and Qureshi, 1997; Rafique, 2000; Rafique, 2001; Rafique et al., 2003). These studies are useful in providing baseline information on species distribution and diversity in different areas, yet are deficient in many ways as none of these studies exclusively encompass the species of special importance and their conservation status in river Kunhar.

The IUCN conservation status of none of the endemic fish fauna, however, has yet been determined except one species, *Glyptothorax kashmirensis*, which is declared as 'Critically Endangered'. Among the other local fish species of Kunhar river indigenous fish species of special importance (*Tor putitora*) is declared Endangered. The local indigenous fish found in the area is mostly endemic to Kashmir and KPK.

Family: Salmonidae

Oncorhynchus mykiss

Salmo gairdneri (Rainbow Trout)

Salmo trutta (Brown Trout)

Family: Cyprinidae

Schizothorax esomus

Schizothorax plagiostomus

Schizothorax micropogon

Schizothorax curvifrons (Snow Trout)

Tor putitora

Cyprinus carpio

Family: Sisoridae

Glyptothorax kashmirensis

9. Monthly Average Temperature Ranges of Kunhar River

Month Temperature (°C)

Kunhar River near Garhi Habibullah (1980-1993) (WAPDA)

January	6.1	July	14.9
February	7.2	August	17.9
March	10.2	September	16.5
April	11.4	October	13.6
May	12.0	November	9.8
June	12.3	December	7.0

10. Potential Impacts and Mitigation Measures

Aquatic ecology is affected by water quality, quantity, availability of breeding habitat (such as spawning and rearing grounds), foot access to the river, fishing methods and terrestrial activities along the river banks and in the watershed (Helland-Hansen et. al., 1995). The existing aquatic habitat of the Kunhar River in the Project area is continuous fast flowing water where water quality and quantity are seasonally affected, primarily by monsoon runoff and snowmelt. The Patrind Hydropower Project will divide the existing aquatic environment into three distinct habitat areas with different flow conditions:

- Upstream of the weir
- Within the weir pond
- Downstream of the weir

a) Upstream of the Weir and in the Pond

Flow rates, water quality and fish habitat in the Kunhar River and its tributaries, above the reservoir will not be affected by the Project, except for the distribution of some aquatic organisms. The presence of the reservoir

will isolate these upstream, fast-flowing habitats from the riverine habitat below the reservoir, preventing migratory species from reaching these areas. The populations of sedentary, resident fish species above the reservoir will not be directly affected by the Project, but will become genetically isolated from populations downstream.

b) Within the weir pond

The weir upstream/at the weir will create a deep, still water aquatic habitat, replacing about 7km of existing riverine habitat. Water quality in the reservoir was found suitable for the protection of aquatic ecosystems. The most productive parts of the reservoir will be the shallower sections where light is able to penetrate to the bottom and allow the growth of attached aquatic macrophytes.

The creation of the lake will provide a large open water fish habitat that could be used for promotion of fish culture especially for cold water fish. The harvesting of fish culture, if it proves viable will be an offset to the lost production. This will also increase the fish fauna and their density to be exploited locally for the socio-economic uplift of local communities.

c) Downstream of the Weir

The Project will alter the Kunhar River flow regime in the stretch starting from the weir to the confluence with Jhelum River (13 Km length). Changes in the flow regime will affect the composition and abundance of planktonic and benthic communities, thus affecting the food supply of fish. These changes will have the potential to influence on the species composition of the fish population in the Project area, but due to the low availability of fish fauna in the Project area as shown by the study results, the impact shall not be significant.

Furthermore, it should be noted that the topography of Kunhar River valley downstream of the weir is characterized by high river banks with relatively deeper bed levels that prevent the use of the Kunhar River for agricultural irrigation and drinking water supply. The operation of the Project for hydropower generation will reduce flows downstream of the weir. A minimum of 2 m³/s of water will be released from the head pond as ecological flow throughout the year. This flow will increase further downstream as numerous medium and small streams enter the Kunhar River, thus providing mitigation measures for aquatic flora and fauna in the downstream reach of the weir. These additional side streams will, on average, contribute an estimated 1.8 m³/s to the Kunhar River flow downstream of the weir.

11. Conclusion

At this time of the study, it is observed that there is minimum impact of the Patrind Hydro Power Project on the aquatic fauna of the river Kunhar both up and down stream. Local economy can be improved by the introduction of intensive fish culture in the reservoir emerging through the construction of Weir at Patrind by engaging the expertise in cold water fish culture. Indirectly, tourism can also flourish through trout fishing.

LITERATURE CONSULTED

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

Annex-10

SUMMARY OF VEGETATION STUDY

Vegetation Monitoring/Study of Patrind Hydro Project



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VEGETATION STUDY OF PATRIND HYDRO POWER PROJECT

1. Abstract

The sustainable management of forests is of central concern to the local people who depend on forest resources for their livelihood, to international conservation agencies, and to the legal custodians of the forests, for social, economic and environmental services of the forests. During the last three decades, the mainstream view of deforestation in the Hindukush-Himalayan region attributed the phenomenon to increased local use due to population growth. This view has been contested in recent years by those who see deforestation rather as a result of complex changes in the socioeconomic conditions of the region.

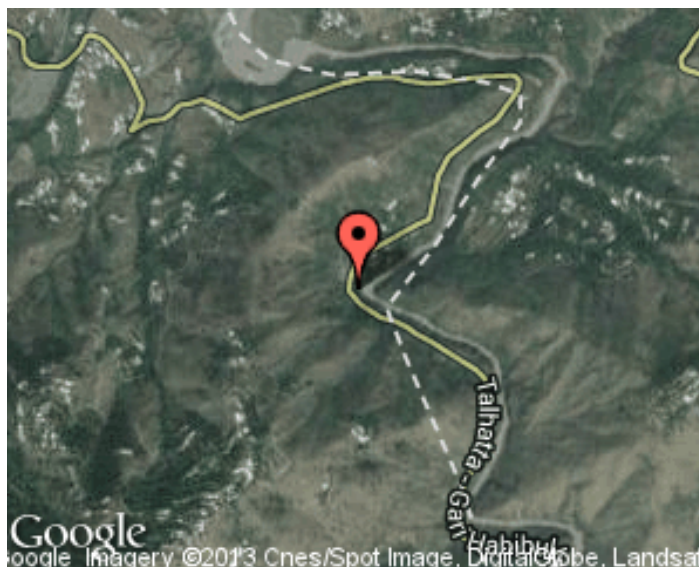
Some of the issues relevant to low vegetative cover are common property management, including political ecology, property rights and co-management. Main tree uses are firewood consumption and timber extraction from the private, guzara and State land. The loss of vegetation is not compensated fully by reforestation resulting into more forest depletion due to population growth. The local firewood collection is not the only main cause of deforestation but it has also occurred due to commercial harvesting and mismanagement by the government Forest Department.

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 depicting the same scenario.

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 month 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 due to the heavy grazing, lopping, poor agricultural practices and urbanization, the original vegetation is almost destroyed. In the result of the shortage of vegetation cover, the area is very badly suffering from soil erosion.

2. Introduction

The study area is about 10 km up and downstream of river Kunhar from the weir point at Patrind (34° 20' 36" N and 73° 25' 10" E at an elevation of 2516 ft) and around the village Alrah (34° 20' 06.05" N, 73° 27' 18.6" E) in AJK. It covers both the eastern aspects on the right bank of river Kunhar in KPK and river Jhelum in AJK and Western aspect on the left bank of river Kunhar.



Patrind project Location

The head lake will be created 7km upstream because of the construction of the weir. Mountains are steep and covered with very poor vegetation. The catchment of Kunhar River is about 1625 km² and river water flow mostly depends on the snow on the mountains and some rain water streams contribute in the lower reaches during the monsoon. Annual rain fall of the catchment area is above 60". The river becomes voracious during the floods and washes away all the structures, sides and changes the bed location as well. The weir must be strong enough to check the water pressure during summer.

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 labor 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 rainstorms.

3. Study Type

There are two main components to the Density Management Study (DMS) vegetation study;

- a). OSU is installing new vegetation monitoring plots at each of the initial thinning sites to evaluate overall treatment effects. These plots are randomly located within the treatments, including gaps and leave islands.
- b). **Permanent vegetation monitoring plots (PVMP)** are established at each site to monitor the relationships of over story and understory vegetation to thinning prescriptions. These plots are only established in thinned forests, excluding gaps and leave islands.

For this project study, Permanent vegetation monitoring plots were established one each at powerhouse side at Alrah and other at the intake of the tunnel at Patrind

4. 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.



Alrah Powerhouse site

5. 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 austarlus* (Batculd) 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 submerged area and away from the area where trees needed to be cut 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 impacts of Patrind Hydropower Project on conservation status of the vegetation of the area.

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

Common Name	Botanical Name	Type of Tree	Status
Phagwarr	Ficus Palmata	soil binder	common
Anjeer	Ficus carica	Fruit	rare
Dhaman	Grewia oppositifolia	Fodder	common
Drawa	Ailanthus anus	firewood	common
Robinia	Robinia pseudoacacia	firewood	common
Drek	Melia azadrach	firewood	common
Batculd	Celtis australis	soilbinder	rare
Kangarr	Pistacia khunjak	soil binder	rare
Talli (shisham)	Dalbergia sisso	furniture wood	common
phulai	Acacia modesta	firewood	common
Sherol	Alnus nitida	Firewood	common
Shahtoot	Morus alba	Fruit	common
Akhrot (Wallnut)	Juglans regia	Fruit	common
Nim	Azadirachata indica	Firewood	common
Kau	Olea cuspidate	Firewood	common
Chir	Pinus roxburglii	Timber	common
Pipal	Ficus religiosa	Firewood	common
Kiker	Acacia nilotica	Firewood	common
Beence	salix spp	Firewood	common
Batang	Pyrus patia	fruit	common
Ber	Zizyphus mauritiana	fruit	common
Snatha	Dodonaea viscosa	soil binder	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 highest from steep slope areas (74.29%) followed by gentle slope and gully bed areas.



Site at Alrah



Site at Patrind

6. Outcome of this study

There has been observed a prominent change from the first study. Both the areas, at Alrah and at Patrind have been treated with lot concreting instead of treating it with plantation and bio engineering. The project is

mostly looked after by the Engineers and to them, it is the easiest and permanent solution for treating the slides. The loss of biomass quantum is not as significant as there has been a low vegetative cover in this area.

The Project site lies in the Guzara/Community owned forests and is far away from the Reserved/Protected forests. On left bank of river Kunhar in Muzaffarabad District no reserved forest exists anywhere near the Project site.

While the Reserved forests on the right bank of river Kunhar in Abbottabad District, Doga Reserve Forest and Shoal Reserve Forests are at least about 3-5 km away from the Project site. Thus the project has no influence on Reserved/Protected forests.

Most of the Chir trees in the area to be submerged were found in Pole stage (age 20-30 years) with few at tree stage. The same is the case with other broadleaved species. So all in all not much cutting was found involved due to the implementation of the project.

It was also observed that most of the submerged area comprised of rangelands of Guzaras forest area with few trees here and there. The Project site consisted of Guzara forests owned by the people/community and they exploit it according to their needs of timber, firewood and fodder for livestock rather than visualizing its protective/environmental role. Due to this the area was in degraded form. Heavy uncontrolled grazing and clearance of area for cultivation also affected the area badly.

The present status of vegetation does not depend upon the river Kunhar water but it depends on precipitation available in the area. 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.

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 of Patrind. At some locations, the groundwater table will rise and the old springs that were once dried up, will become functional allowing the farmers to extract water using simple animal traction. However, with the construction of tunnel, the water stored in the catchment area will be disturbed affecting some of the deep rooted plant species at some places. 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 the dependence on that water is not existing; so no social impact is expected.

8. Suggestion

Since the area close to the tunnel inlet and outlet of the tunnel where working concentration is high, the impact on the vegetation and water courses will have negative impact. Similarly the lake will submerge some of the vegetation due to rise in water level. 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. Some 6 water springs will be affected by the construction of tunnel; water from alternate sources should be made available to the spring dependent communities. During next biannual monitoring survey of aforesaid water sources will be carried out so that remedial and alternative arrangements could be proposed, in case, if in fact the sources have been affected or diminished, however it has yet not been reported/confirmed.

3. Areas of high working concentration (in-let and outlet of the tunnel) were facing the problem of soil erosion and these have been treated by Shot Crete. It was suggested in the last study 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 seeding, 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 contributes to the process of global warming and environmental degradation. 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.



A view of the thin Chirn Pine (*Pinus roxburghii*) forest at Power house site