

# Environmental and Social Monitoring Report

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Project Number: 44914-014  
Quarterly Report 2015 (January – March 2015)  
March 2015

## Pakistan: Patrind Hydropower Project

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

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# **STAR HYDROPOWER LIMITED**

## **147 MW PATRIND HYDRO POWER PROJECT**

### **ENVIRONMENTAL & SOCIAL MONITORING REPORT**

**(JANUARY-MARCH 2015)**



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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 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 2015 the physical progress achieved is 43.07%.

**iii. Location of project**

Village Patrind, District Muzaffarabad, Azad Jammu and Kashmir

**iv. Nature**

Run of river Hydropower Project.

**v. Scale/size**

147 MW

**vi. Date of construction/operation commencement**

Preliminary works commencement: September 2011

Main works start after issuance of NTP: December 2012

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

 Prepared By: Syed Atif Ali Shah Designation: Manager HSE	 Reviewed By: Kyung Hwan Lee Designation: Deputy Chief Executive Officer
 Approved By: Waqar Ahmad Khan Designation: Chief Executive Officer	

**b. Relevant Environmental Permits or Compliance Certificates**

**a) Summary of permit conditions and media covered:**

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

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

Communicate any change in the approved project to AJK-EPA and that would be commenced after obtaining the approval. The approval shall stand null and void if the conditions mentioned herein before are not fully complied with. It does not absolve the proponent of the duty to obtain any other approval or clearance that may be required and can be withdrawn at any time with any prior notice if deem necessary in the public interest.	For the changes in the design of the weir site layout and Addendum to the EIA report was submitted to both the EPAs i.e. EPA AJ&K and KP covering the changes to be made in the design which was subsequently approved by both the EPAs on November 19, 2014.
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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 operation level of the Project is at 765 masl. The Company acquired the land at the level of 767 masl as per the condition of the EPA. The additional 2 meters shall act as safety zone and the owners were compensated as per the procedure.
The project management should contribute towards the repair of the road to be used during construction and operation activities of the project. The trees supposed to be submerged should be counted in the presence of all stake holders i.e. owners land collectors /patwari representing revenue department representative of EPA and forest/agriculture department. After the determination of exact number type and ownership of the trees be finalized and paid as per laid down procedure of the government	The owners have been compensated for the trees supposed to be acquired due to the land acquisition. The trees were counted in the presence of all stake holders i.e. owners land collectors /patwari representing revenue department representative of EPA and forest/agriculture department. Uneven section of project access road passing through Sarati village has been repaired with graders. Damaged portion, will be repaired if any. The maintenance of the access roads near the project area is part of Social uplift plan
Minimum flow of 2 cumecs in the downstream of weir in Kunhar River should be kept and provision for 10% extra of this amount of water for emergency in downstream should also be kept in plan. No extension would be permitted in the future in existing hydropower project without prior approval of the EPA /government of Khyber Pakhtunkhwa	Shall be applicable during the operation phase of the Project
Separate NOC is required for batching/crushing plant	NOC was obtained from EPA KPK for installation of two batching plants near the weir site



**b) Relevant Government Agencies**

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

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

**c) Issuance dates and duration of validity**

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

**d) Renewal Requirements:**

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

**c. Incidents of Violations or Non-Compliance**

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

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

- Air emissions have randomly been observed at powerhouse slopes due to poor maintenance of the machinery that affects the local environment; therefore,

instructions were given to concerned sub-contractor Kyoung Dong for proper maintenance.

- Waste management regarding residual waste has not been held properly during the month of January due to unavailability of trench in the disposal area, so the waste has been sent to the EPA'S approved landfill site by MCM.
- Soil contamination has been observed at different locations due to leakage of the Kyong dong machinery for which drip trays have been provided to control spillage. Fuel spillage has also been observed at surge shaft due to temporary storage of the fuel tank by Kyoung dong. Corrective actions were taken in this regard to control spillage by placing spill kit under the tank.
- Inconsistency occurred in cleaning the sedimentation chambers downstream the HRT that resulted river water contamination due to overflow of sludge. Cleaning of the tank and its soakage pit was undertaken to mitigate downstream water degradation.

#### **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

#### **Warning Letters for Non Compliances**

During reporting period, depending on nature and severity of violation warning letters have been issued to the violators. Verbal warning is given for the first time on minor violations. If any employee fails to abide by HSE policies after verbal warning a written warning letter is issued. 41 warning letters were issued for incident for violations of HSE procedures. List of warning letter is given in the table below. As per EPC's standard procedure after three warnings employee would not be able to continue his/her job. However, before removal it is important to ensure that individual has been informed / trained and provided with the necessary PPEs.

**WARNING LETTERS**

Sr. No.	Name	Date			Site	Company	Designation	Reasons	
		Day	Month	Year				1	2
1	Babu Sajid	1	1	2015	Weir Site	Daewoo E&C	DT, driver	Unsafe Behavior	Unsafe Operating
2	Khan Azad	1	1	2015	Weir Site	Kyung Dong	Excavator Operator	Unsafe Behavior	Unsafe Operating
3	Mukrameen	16	1	2015	Weir Site	Kyung Dong	DT, Operator	Unsafe Behavior	Without PPE
4	Rozi khan	16	1	2015	Weir Site	Kyung Dong	DT, Operator	Unsafe Behavior	Without PPE
5	Azaid	16	1	2015	Weir Site	Kyung Dong	DT, Operator	Unsafe Behavior	Without PPE
6	M.Iqbal	24	1	2015	Upper Site	Kyung Dong	DT, Helper	Unsafe Behavior	Without PPE
7	Khan Bahdar	24	1	2015	Upper Site	Kyung Dong	Dt. Operator	Unsafe Act	Operating without PPE
8	Azhar Mehmood	24	1	2015	Upper Site	Kyung Dong	Ex. Operator	Unsafe act	Unsafe driving
9	M. Khalid	9	1	2015	Power House site	HESPAK	Site Supervisor	Unsafe Behavior	Failure to supervise
10	Junaid	18	1	2015	Power House site	HESPAK	Site Supervisor	Failure to supervise	-

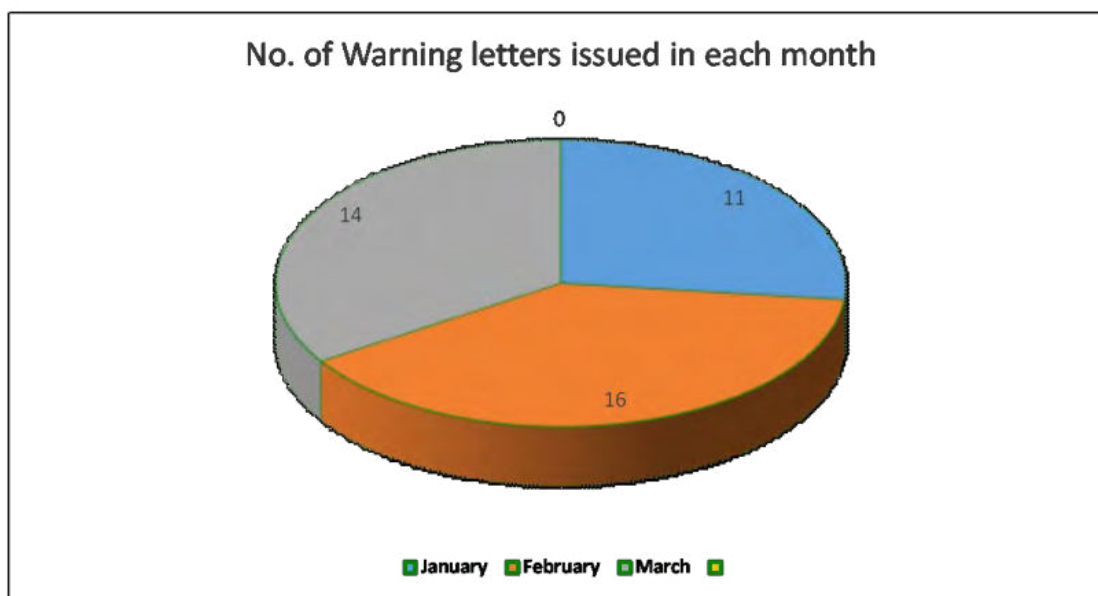
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11	Kim Byung Sun	23	1	2015	Power House site	Daewoo E&C	Site Supervisor	Unsafe Behavior	Crossing Barricades
12	Muhammad Amjad	2	2	2015	P/H Site	Naveed Brothers	Steel Fixer	Unsafe Behavior	PPE Violation
13	Mir Muhammad Imran	2	2	2015	P/H Site	Naveed Brothers	Steel Fixer	Unsafe Behavior	PPE Violation
14	Gulistan Ahmed	2	2	2015	P/H Site	Naveed Brothers	Steel Fixer	Unsafe Behavior	Without PPE
15	Ameerullah	2	2	2015	P/H Site	Naveed Brothers	Steel Fixer	Unsafe Behavior	Without PPE
16	Muhammad Jahanzaib Kiyani	2	2	2015	P/H Site	Naveed Brothers	Steel Fixer	Unsafe Behavior	Without PPE
17	Abdul Hameed	12	2	2015	P/H Site	HESPAK	Labor	Unsafe Behavior	Without PPE
18	Nauman Rasheed	12	2	2015	P/H Site	Naveed Brothers	Steel Fixer	Unsafe Behavior	Without PPE
19	Umer	12	2	2015	P/H Site	HESPAK	Electrician	Unsafe act	Without PPE
20	Hussain Khan	12	2	2015	Power House site	HESPAK	Site Supervisor	Unsafe Behavior	Failure to supervise
21	Umer Hayat	12	2	2015	Power House site	HESPAK	Site Supervisor	Without PPE	-
22	M. Khalid	23	2	2015	Power House site	Daewoo E&C	Site Supervisor	Failure to supervise	Unsafe Behavior
23	Tajammul Akram	23	2	2015	Power House site	HESPAK	Gypsum fitter	PPEs Violation	working without induction
24	Aftab Rustam	23	2	2015	Power House site	HESPAK	Gypsum fitter	PPEs Violation	working without induction
25	Nisar Ahmed	23	2	2015	Power House site	Daewoo E&C		Refused to follow the instructions	
26	Kim B.H	12	2	2015	Weir site	Sungbo	C/ Manager	Unsafe behavior	Failure to supervise
27	Kim Moun	12	2	2015	Weir site	Sungbo	Carpenter foreman	Un safe act	

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28	Mr. Tariq	3	3	2015	Weir Site	Daewoo E&C	Operator	Un safe act	
29	Muhmmad Umair	3	3	2015	Weir Site	Sungbo E&C	Operator	Unsafe Behavior	Without PPE
30	Qutab Khan	3	3	2015	P/H Site	Excavator Operator	Steel Fixer	Unsafe Behavior	Failure to supervise
31	Hakim Din	9	3	2015	P/H Site	Daewoo E&C	Foreman	Unsafe Act	Without PPE
32	Gulam gillani	19	3	2015	Weir Site	Daewoo E&C	Operator	Unsafe Behavior	Without PPE
33	Moon ta kim	19	3	2015	Weir Site	Sungbo E&C	Carpenter Supervisor	Unsafe Behavior	Without PPE
34	Aamir	19	3	2015	Weir Site	Sungbo E&C	Site Engineer	Unsafe act	Without PPE
35	M.Asif	19	3	2015	Weir Site	Sungbo E&C	Excavator operator	Unsafe Act	Without PPE
36	Hadlat khan	24	3	2015	Weir Site	Sungbo E&C	DT. Operator	Without PPE	-
37	Raja Nazim	24	3	2015	Weir Site	Sungbo E&C	PT. Operator	Without PPE	Unsafe Behavior
38	Jan bahdur	24	3	2015	Weir Site	Kyung Dong E&C	Operator	PPEs Violation	Unsafe act
39	Bilal	24	3	2015	Weir Site	IVCC	Helper	PPEs Violation	Unsafe act
40	Babar	28	3	2015	Weir Site	IVCC	Welder	PPEs Violation	Unsafe act
41	Bilal	24	3	2015	Weir Site	IVCC	Helper	Un safe act	





**d. Incidents of Environmental and Safety Accidents**

**a) Environmental Accidents and Mitigation**

- No major environmental incident occurred during the reporting quarter on both the sites. However, minor soil contamination due to inappropriate handling of oil has been observed.
- Dust on Project access roads due to vehicles movement has been observed and mitigated through frequent sprinkling.
- HRT waste water sedimentation/treatment tanks were partially cleaned. Efforts were made for frequent de-sedimentation.
- The waste is properly collected from all site areas, segregated and then non recyclables are disposed into the trenches.
- The excavated material is being transferred to the disposal area at upper site but no embankment has yet 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 M&E workshop area and is being stored for reuse in powerhouse backfilling.

Following preventive and mitigation measures are adopted;

- Filter cartridges of the water filtration plant were changed on both the sites to ensure clean drinking water.

- Shotcrete activities have been undertaken to stabilize slopes and to mitigate risk of erosion and to minimize landslide risk.



Slope protection works on power house site

- Excavated material is being dumped in designated disposal areas on both sites
- According to the nature of work inspections have continuously been carried out during the reporting period to reduce the risk of accidents and impacts on environment and for proper maintenance of machineries and other equipment
- Quarterly Fish fauna and vegetation monitoring undertaken
- Hunting and fishing activities are prohibited on Project sites.

**b) Health and Safety Accidents and Mitigation**

During the reporting quarter, coordination meetings, monitoring and inspections were undertaken jointly by EPCC and OE's HSE staff with regard to site HSE status mainly for appropriate waste management and blasting activities.

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

**Environmental & Social Monitoring Report (January-March 2015)**

<b>Incident</b>	<b>No.</b>	<b>Description</b>	<b>Media or Community Reaction</b>
Fatality (Non-Occupational )	1	Mr. Rashid (Late) and Mr. Junaid (tower crane operator) were busy in repairing of the tower crane, after finishing their duty, Mr. Rashid (Late) was coming down by the ladder, while Mr. Junaid was still at the top of the tower crane near the operator's cabin, when Mr. Rashid (Late) was at the platform at 40 Ft height from the ground, he stopped, then Mr. Rashid (Late) fell down from the tower crane, and died on the spot. (Witness statement is attached). Doctor examination shows that the root cause of the death was Heart attack. Therefore, incident was declared as Non occupational Fatality on site. Initial Incident Report presented as <b>Annex-1</b> .	None
First Aid Case	03	<ul style="list-style-type: none"> <li>i. Based on the gathered information at the scene of the incident, on 17<sup>th</sup> January 2015, Mr. Nazim was operating the grout machine at power house slopes area. During the operation one pipe of machine was broken down and cement grout splashed and a little amount fell in to the eyes of Adnan Tariq, QA/QC lab assistant who was standing nearby. Mr. Adnan was immediately brought to the site Clinic and was treated by the Doctor using Eye wash. Although he was fit but as precautionary measure was sent to the Ambore Eyes hospital for further examination. No more foreign body or any type of the damages were found, therefore IP resumed his job on same day.</li> <li>ii. On 11<sup>th</sup> Feb 2015, SUNGBO workers were busy in the cleaning of the weir rock bed regarding concrete pouring preparations, meanwhile the installed farm work collapse due to the insufficient support. 5 workers got minor injuries after first aid they resumed their jobs.</li> <li>iii. On 19<sup>th</sup> March 2015, Mr. Umer, Assistant Surveyor, Sungbo E&amp;C was conducting survey activity at weir site on 8:10 PKT. While standing at the edge of steel formwork which was not fixed properly he moved to finish his job but all of a sudden, formwork plate slipped and he fell down and got injury on leg. First Aid was given to IP and for further checkup he was sent to nearby Hospital. No more complication found.</li> </ul>	None
Medical Treatment Case	None	None	None

**Environmental & Social Monitoring Report (January-March 2015)**

Damage only incident and Near Miss	None	None	None
Property damage/environmental incident	2	<ol style="list-style-type: none"> <li>1. Based on the gathered information at the scene of the incident, on 2<sup>nd</sup> March 2015, at 3:30 AM, Chain excavator, EX- 200 was working on the powerhouse slopes, suddenly the short circuit occurred in his electrical wiring, within the short time fire spread in the machine cabin and engine. Operator and the helper fought the fire with fire extinguishers and sand, but the operators cabin got burnt completely and but luckily no was injured.</li> <li>2. On 10<sup>th</sup> March 2015, Double cabin pickup having plate number CL-0139 was parked at the back of the Kyung Dong workshop area, the car was working at the night shift and the driver parked it at the back of the workshop in the morning at about 6' O Clock and left to his home. Suddenly there was a short circuit in the electrical wiring of the car and the fire started. The workers of the workshop observed the fire and tried to extinguish it by using the fire extinguishers placed inside the workshop, but the vehicle was seriously damaged until the fire was extinguished. The HSE team was informed about the incident immediately through a phone call, the HSE Staff approached the area along with the fire extinguishers but the fire was already extinguished.</li> </ol>	None
Medical Checkup / Examination / Treatment	627	<p><b>January 2015:</b></p> <p>177 (91 Upper Site + 86 Lower Site)</p> <p><b>February 2015:</b></p> <p>159 (106 Upper Site + 53 Lower Site)</p> <p><b>March 2015:</b></p> <p>291(Lower site = (172,Upper site =119)</p>	None

**Safety Milestone**

3.8 million Safe man-hours were completed in the month of March, 2015.

**External Monitoring /Inspection**

Sites HSE internal inspection has remained an ongoing activity. As part of external monitoring one of the Lenders IFC Environmental & Social Monitoring Team visited the site on 19-20 January 2015. During aforesaid IFC Mission, meetings with local community representatives and



Project affected people on both sites were conducted. IFC team was much satisfied with the HSE performance of the Project.



On-site briefing to IFC team



IFC team meeting with PAPs in Sarati

On 24<sup>th</sup> February, 2015 Lender's Technical Advisor visited the site. Besides technical aspects FTA pointed out HSE issues such as waste water proper treatment after discharge from HRT, third party inspection of heavy equipment, site close supervision and delayed documentation. Subsequent corrective actions were undertaken as recommended by FTA.



FTA visit and site briefing on Feb 24, 2015





On 28<sup>th</sup> February, 2015 a high level delegation comprising K-Water/SHPL and Daewoo E&C's top management visited both sites to monitor civil works progress and site HSE status.

#### **Internal Inspections Conducted During Reporting Period**

To mitigate safety incidents, machinery, equipment and electrical appliances are being inspected to ensure fitness through color coding system. List of inspections done during the quarter are attached as **(Annex- 2)**.

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

Following inspections have been undertaken during quarter;

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

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

1. Workers (attached with Daewoo E&C and sub-contractors) have been provided with necessary Personal Protective Equipment (PPE) comprising of helmets, safety shoes and safety jackets and ankle belts to prevent injuries.
2. Warning letters have also been issued to the personnel found to perform activities that are against the rules and regulations of the HSE
3. Newly employed staff, labor and daily wagers were given HSE inductions so that they are aware of potential risks associated with the construction sites emergency procedures

4. Safety campaigns and awards are distributed to encourage and develop safe work behavior in labor and staff
5. To mitigate safety incidents, machinery, equipment and electrical appliances are being inspected to ensure fitness
6. Regular trainings/education sessions for staff and labor
7. Water sprinkling on project access road for community health and safety.

**Permit To work (PTW)**

For the following activities permit to work have been issued during the quarter

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

**e. Labor Relations and Conditions**

**(i) Nature of labor dispute or grievance**

No labor dispute or conflict with local community was observed or reported during quarter and no social incident happened during the quarter.

**(ii) Legal requirements, Permit conditions and renewal requirements**

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

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

**(iii) Authorities in charge of investigation/recording**

In case of any labor incident, Site Construction Manager and HSE staff is responsible to

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

**(iv)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 indicates corrective actions for further compliance by construction team.

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

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

- 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



Prefabricated accommodations labour at upper & lower Sites

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

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

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

CONTRACTUAL TERMS/ CONDITIONS	STATUS OF COMPLIANCE DURING QUARTER
<b>ENGAGEMENT OF STAFF AND LABOR</b>	
Except as otherwise stated in the Project Requirements, the Contractor shall make arrangements for the engagement of all staff and labor, local (People living in project vicinity) or otherwise, and for their payment, housing, feeding and transport	EPC contractor has made all necessary arrangements for the engagement of all staff and labor and payment for their wages/ salaries, housing, feeding and transport. However, the local staff/workers do not need housing in the project base camp

**Environmental & Social Monitoring Report (January-March 2015)**

The Contractor and its subcontractor(s) shall prefer, to the extent practicable and reasonable, to hire unskilled staff and labor, and skilled staff and labor with appropriate qualifications and experience, who are residents of AJ&K or KP especially who are the affected of the Project	More than 200 of unskilled jobs have been provided to nearby communities (Alda, Thori, Patrind, Tarcheela, Sarati, and other adjacent localities). Also preference has been given to local people who qualify for skilled positions
The Contractor shall, and shall ensure that its subcontractors shall, fulfill and observe the Environmental and Social Requirements in relation to the engagement of staff and labor	EPC Contractor has established a proper mechanism of daily and weekly reporting and consistent monitoring of HSE and related social issues. On the basis of recommendations, corrective measures are being taken accordingly

**RATES OF WAGES AND CONDITIONS OF LABOR**

The Contractor shall pay rates of wages, and observe conditions of labor, which are not lower than those established for the trade or industry where the work is carried out or as prescribed under the Laws of the Country. If no established rates or conditions are applicable, the Contractor shall pay rates of wages and observe conditions which are not lower than the general level of wages and conditions observed locally by employers whose trade or industry is similar to that of the Contractor.	Minimum salary as per local labor law (AJK) 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/- plus food and accommodation if required.
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**PERSONS IN THE SERVICE OF OTHERS**

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

International Human Rights & Core Labor Standards The Contractor shall comply with all the relevant labor Laws applicable Contractor's Personnel, including Laws relating to their employment, health, safety, welfare, immigration and emigration, and shall allow them all their legal rights.	All regulations are in implementation. Local labor laws were devised in light of International Human Rights & Core Labor Standards; therefore, compliance with local standards is same with international laws /standards. Furthermore, Pakistan has ratified ILO's conventions on core labor standards.
The Contractor shall require its employees to obey all applicable Laws, including those concerning safety at work.	Site HSE status has been improved due to regular instructions and corrective measures.
Abolition of child labor	To ensure the abolition of child labor the Computerized National Identity Card (CNIC) has been made mandatory for induction which is only provided by the GOP after the age of 18.



**Environmental & Social Monitoring Report (January-March 2015)**

Elimination of all forms of forced or compulsory labor	No forced labor observed /reported during quarter. Furthermore, during site inspections by SHPL, OE and EPCC's HSE staff, it is strictly checked that no forced labor has been undertaken on any site in any form.
Elimination of discrimination in respect of employment and occupation	No discrimination exists as all persons have been provided equal opportunities irrespective of color, race, origin and nationality. Only difference is the nature of job and relevant skills. 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 labor union or association has yet not been established.

**WORKING HOURS**

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

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

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

On both sites, all time availability of clinical staff and facilities has been insured. During quarter 629 staff and workers visited medical facilities. 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, flue and headache etc. Availability of first aid boxes has also been ensured at all sites Implementation of local labor standard



*An emergency MOC drill was conducted by HSE Department on 11 February 2015 at Power House Site involving labors to tackle any incident promptly.*

**(viii) 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

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

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

**(x) Local Employment Status:**

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

Company	AJ&K							KPK						Others	Total Employees
	Alrah	Thori	Patrind	Tarshila	Shoran	Other AJ&K	Sub-Total	Sarati	Boi	Deedal	Dalola	Others	Sub-Total		
Daewoo	1	52	11	-	-	163	227	2	10	1	19	32	64	74	365
Kyung Dong	15	17	12	-	-	124	168	-	2	1	6	19	28	29	225
Sungbo	-	-	22	4	5	26	57	-	7	4	23	26	60	7	124
Naveed Brothers	-	6	-	-	-	12	18	-	-	-	-	3	3	0	21
Hespak	-	-	-	-	-	16	16	-	-	-	-	26	26	0	42
Watch Man	-	-	2	-	-	-	2	-	17	-	-	-	17	0	19
Gurad & Guides	-	-	-	-	-	32	32	-	-	-	-	-	-	0	32
Total	16	75	47	4	5	373	520	2	36	6	48	106	198	110	828
	3.08%	14.42%	9.04%	0.77%	0.96%	71.73%	62.80%	1.01%	18.18%	3.03%	24.24%	53.54%	23.91%	13.29%	100.00%

**Compliance with legal requirement for employment**

<b>Project Legal Agreement/Contract</b>	<b>Conditions/Requirements</b>	<b>Compliance Status</b>
EPC Contract Section 6.1 “Engagement of Staff and Labor”	“The Contractor and its subcontractor(s) shall prefer, to the extent practicable and reasonable, to hire unskilled staff and labor, and skilled staff and labor with appropriate qualifications and experience, who are residents of AJ&K or KP especially who are the affectees of the Project”	Nearly 85% of man power is employed from local areas (AJK 62%& KPK 23%)
As per Para 5 (n) of Environmental approval issued KPK EPA Approval Condition	“Non-technical jobs should be provided to the local community. Employment record for all positions shall be provided to EPA-Khyber Pakhtunkhwa and priority should also be given to local in technical jobs but not at the cost of merit or requirement of the management of the project”	Unskilled jobs have been provided to local residents whereas preference has been given to locals for technical positions but subject to availability
As per condition (xii) stipulated in Environmental approval issued by AJK EPA	“As far as possible, employment should be provided to local people for all unskilled jobs. Preference may also be given to local people for all semi-skilled and skilled jobs. Employment record for all positions shall be provided to AJK-EPA positively”	Employment opportunities have been disclosed to the local communities through different avenues such as newspapers advertisement, public notice on prominent locations and through community coordinators and local project staff. Preference has been given to the locals subject to availability of skilled and unskilled human resources

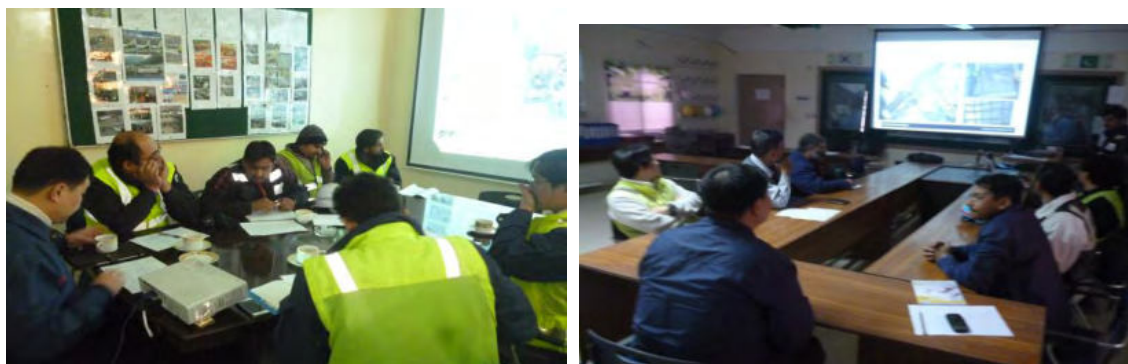
**f. Environmental and Social Capacity**

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

EPCC has a balanced team of HSE staff comprising safety, environment and health professional. Organizational chart is annexed as **Annex-3**. An orientation to environmental management, health and safety during construction work is part of induction form of all the staff and workers hired. Furthermore, daily HSE monitoring, toolbox meeting programs and other related activities raise the awareness level among all staff and workers.

**ii. HSE Weekly Meetings:**

As per monthly HSE Plan, weekly internal meetings and meetings with site construction teams have regularly been conducted on both sites list of meetings is attached as (Annex-4). Issues regarding compliance with HSE standards have always been main agenda items during the meetings.



**iii. Environmental laws and regulations:**

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

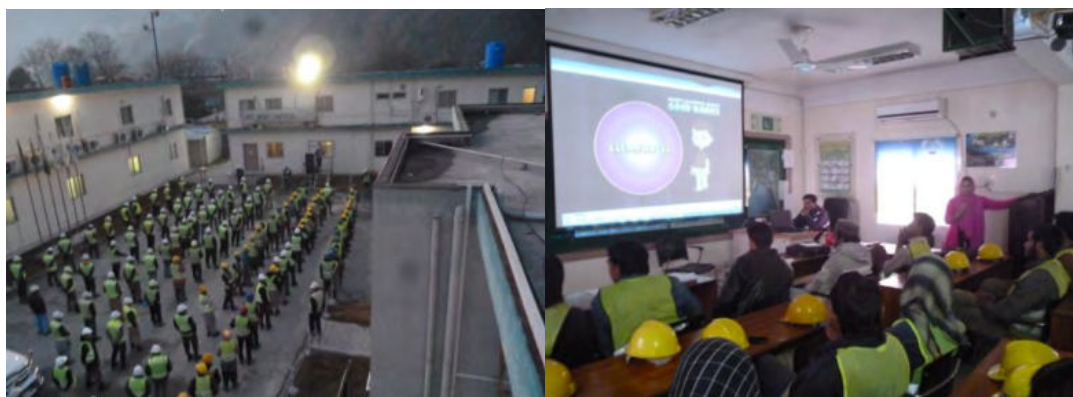
- Pakistan Environmental Protection Act 1997
- National Environmental Quality Standards (NEQS)
- AJK Environmental Protection Act 2000
- Land Acquisition Act 1894
- Draft National Resettlement Policy 2002
- NWFP Forest Ordinance 2002
- Sarhad National Conservation Strategy 1992
- ADB Safeguard Policy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

**iv. 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

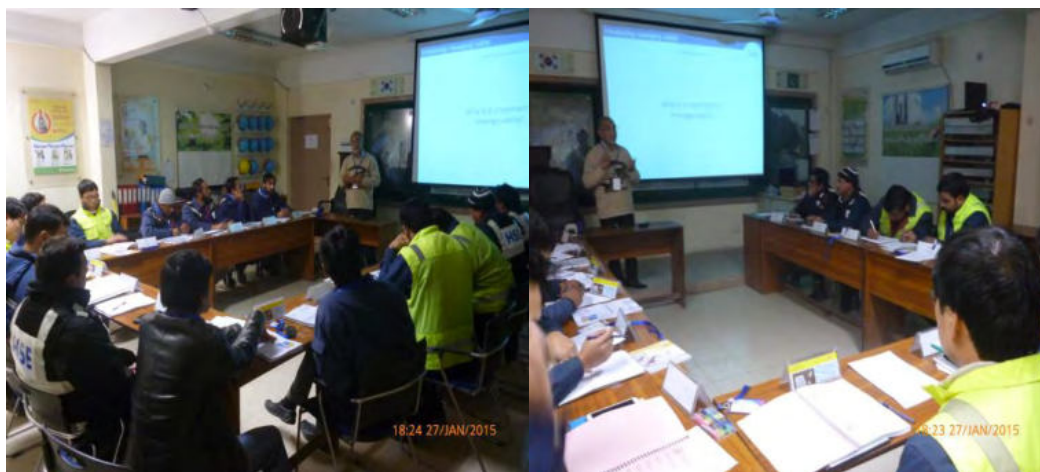


modifications have been made in manual. List of the trainings and campaigns undertaken during the quarter is attached as (**Annex-5**).



### **IOSH Training:**

EPC Contractor arranged 4 days (26-29 January 2015) International Certificate Course “IOSH -Managing Safety” for site Engineers, Supervisors and Managers to enhance their capacity to address the HSE Issues efficiently. At lower site 15 employee participated in said course and Rs. 45000/= were paid per participant to Course Organizers (INSPIRE Training & Consultancy) to provide IOSH training), whereas, at Weir site 10 persons including OE’s and subcontractor staff completed the course. The Institution of Occupational Safety and Health (IOSH) is the only Chartered body for health and safety professionals in the world.



IOSH Session Lower Site



IOSH Session Upper Site

Course module consists below mentioned 8 modules followed by a written exam and a Project.

1. Introducing managing safely
2. Assessing Risk
3. Controlling risks
4. Understanding your responsibility
5. Identifying hazard
6. Investigating accidents and incidents
7. Measuring performance
8. Protecting our environment

All participants successfully completed the course and were awarded certificate by IOSH UK.

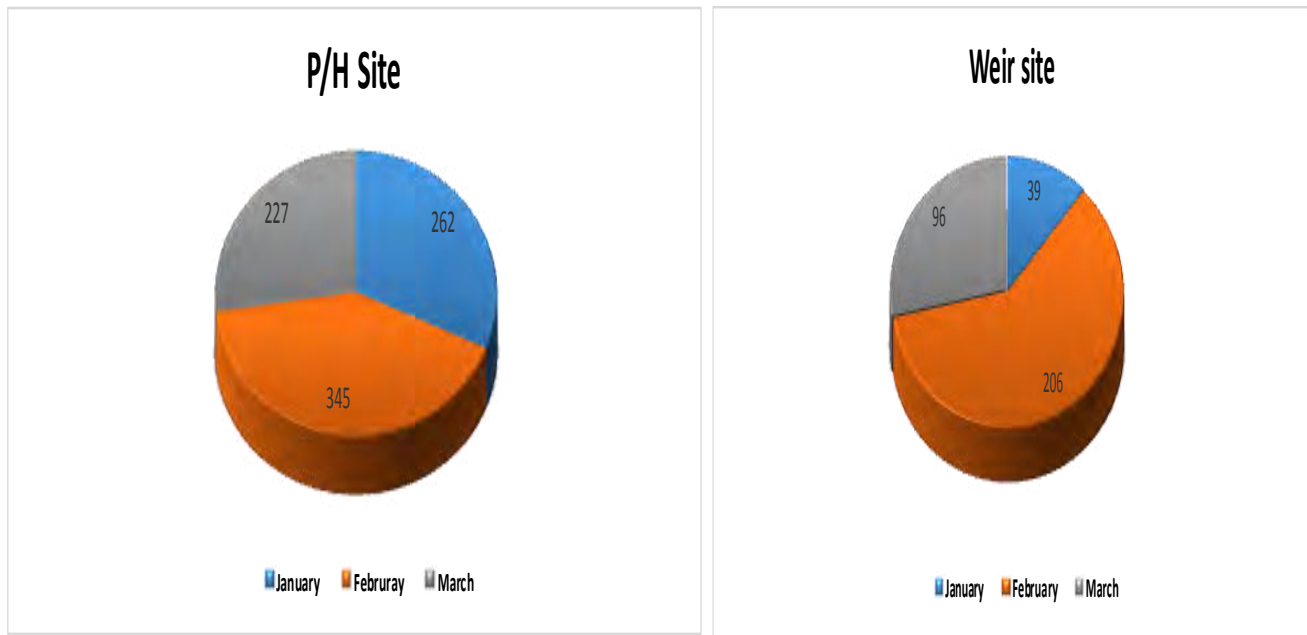
**v. Induction Training**

As part of EMP all staff and workers before starting their respective jobs have been given induction training as per “Induction Performa” recommended in EMP document.

The induction trainings done during the quarter is given below;

**Table: Inductions**

Months	Total No of Induction Trainings		Total No. of employees inducted	
	Lower Site	Upper Site	Lower Site	Upper Site
January	40	10	262	39
February	64	49	345	206
March	33	23	227	96



**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.

**vii. Daily Education/Training on site**

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



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

**viii. Monthly Safety Award**

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



**Safe work campaign and safety awards**

**Safety Awards (UA/UC Card)**

1	Sung Khee Seong	Daewoo E&C	Best Manager	P/H Site
2	Muhammad Adeel	Kyungdong E&C	Best Labor	P/H Site
3	Kim Byung Hwan	Sungbo E&C	Best Manager	Weir Site
4	Mubashir Ahmed	Daewoo E&C	Best Engineer	Weir Site
5	Lee Im Seok	Kyungdong E&C	Best Foreman	P/H Site
6	Sajid Majeed	Daewoo E&C	Best Engineer	P/H Site
7	Mubashir Janjua	Daewoo E&C	Best Engineer	P/H Site
8	Abdul Rasheed	Sungbo E&C	Best Labor	Weir Site
9	Gul Raiz	Sungbo E&C	Best Labor	Weir Site
10	Muhammad Arif	Kyungdong E&C	Best Labor	Weir Site



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

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

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

1. Work on Height
2. Pollution Prevention
3. Corporate Social Responsibility
4. Safe behavior

**g. Stakeholder Consultation/CSR Activities**

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

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

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

**School Environment & Safety Awareness:**

Daewoo E&C HSE team organized an environment health & safety awareness program in a local primary school in Patrind village near the left bank of Patrind Hydropower Project at the weir site. The awareness program was organized in the Government Girl's Primary School Patrind, AJK. The first of all a small awareness session was conducted about basic environment, hygiene and good practices and then students were made aware about the school level safety road safety and the importance of safety in their lives. HSE team leader Mr Choung Myuong Hun and Admin Manager (weir site) Mr. Y. T Jang distributed the gifts among the school children containing notebook, pencils, and biscuits. School administration and teachers welcomed and appreciated the efforts of Daewoo E & C and its HSE team and

also requested for some financial support in the completion of construction of the new building.



Another programme was held in Kashmir Citizen Model School Lower Chatter near power House Site. School staff and students were informed about the project and its importance .HSE Manager & Environment Officer educated about environmental protection and road safety. EPCC's HSE team provided gifts and refreshment to staff and children.



#### **EPCC's Participation in Annual Plantation Campaign:**

As requested by AJK EPA, EPC Contractor contributed a lump sum amount of Rs.200, 000 for establishment of block plantation and associated campaign as tribute to victims of Peshawar incident while considering it a noble cause and also as part of EMP implementation. The procurement, plantation and maintenance of the selected species are being carried out by the Forest Department itself. Approximately 10,000 plants have been planted in upstream watershed of power house site on right bank of River Jehlum.



A cross cheque amounting 200, 00 rupees was presented to Secretary Forest government of AJK during a ceremony held on 9th February 2015. All heads of Government Department, Ministers, Speaker Assembly, Army Officers, WAPDA, school children and civil society representatives participated in the campaign.

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



**Table: Organizations/NGOs consulted during the quarter**

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

**Rental Vehicle and H. Equipment Summary**

Company	AJ&K							KPK						Others	Total Hired
	Alrah	Thori	Patrind	Tarcheela	Shoran	Other AJ&K	Sub-Total	Sarati	Boi	Deedal	Dalola	Others	Sub-Total		
Daewoo	1	1	1	2		14	19	4	1		2	1	8		27
Kyung Dong						16	16					15	15	3	34
Sungbo			4			2	6	4	2		3	1	10		16
Naveed Brothers						4	4						-		4
Hespak						3	3						-		3
DaeKwang							-						-		-
Total	1	1	5	2	0	39	48	8	3	0	5	17	33	3	84
	2.08%	2.08%	10.42%	4.17%	0.00%	81.25%	57.14%	24.24%	9.09%	0.00%	15.15%	51.52%	39.29%	3.57%	100.00%

### **Agitation by Locals:**

On January 7, 2015 at 7:30 am on weir site an agitation by the locals from adjacent villages was observed as about 20 persons who started the demonstration and threw the stones and fire crackers on the workers and near the explosive storage area. The situation became dangerous and the local police was called for the security and safety of the workers of the Project and the property itself. A person named Sardar Tasleem was leading the for getting attention by the local authorities, politicians and the local media .Demonstration leaders asked for jobs and contracts for local people.

EPCC asked for help to police to solve this problem. Police arrested 20 people including Sardar Tasleem (main leader). On Jan 26, 2015 People are released by bail.

### **i. Compliance and Implementation of Mitigating Measures in ESMP**

Compliance monitoring of environmental and social management plan has been an on-going activity undertaken by OE and EPCC's HSE staff on both sites. Non compliances with recommended standards and regulations were recorded and reported daily, weekly and monthly. EMP Compliance status is attached as (**Annex-6**).

#### **a. Environmental monitoring under EMP:**

Internal Environmental and Inspection checklist is developed and being filled on daily bases (**Annex-7**). Besides this following activities have been undertaken as part of environmental monitoring:

#### **i. Fish fauna Study/Monitoring:**

Quarterly Study/monitoring was undertaken in Kunhar River (Up & down stream of Project site) on 24<sup>th</sup> March 2015. Samplings were carried out at the six study points. This monitoring and its comparison with the past monitoring in last one and half year that apparently there are no significant changes appeared on the aquatic environment of Kunhar River. Some insignificant changes in the fish catch and quality of water observed during the study is only due to the irregular seasonal changes and pattern of water turbidity due intensity of rain or drought. Detailed report is annexed as **Annex-8**.



**ii. Flora Study/Monitoring:**

Quarterly Study/monitoring was undertaken at both (Power house & weir) sites in March 2015. The outcomes of the monitoring shows a decrease in the vegetative cover on both the sites, and increase in landslide has been observed. The monitoring report recommends the bio-engineering works for the treatment of unstable slopes and stabilization of landslides to retain the good looks and better environment as well; detailed report is annexed as **Annex-09**.

**Table: Compliance with NEQ's**

<b>Environmental component</b>	<b>Standards (NEQS)</b>	<b>Compliance/Mitigation measure</b>	<b>Remarks</b>
<b>Air Quality</b>	EPA ambient air quality  (EPAs standards for each Parameter )	NEQS:  To ensure dust suppression due to transportation activity, unpaved roads are being sprinkled with water at least twice a day.  The EPC is taking all necessary measures to limit pollution from dust and any wind-blown materials during construction.	Ventilation is improved in HRT after breakthrough.
<b>Water quality</b>	WHO Guidelines  (EPAs standards for each Parameter)	Tests for drinking and waste water quality were undertaken on biannual basis during March & September 2014.  Waste water from tunnel is treated through sedimentation tanks. Waste water discharged from HRT is being measured	Biannual quality monitoring of waste and drinking water will be undertaken during April 2015 for both sites and results would be shared with stakeholders during 2 <sup>nd</sup> quarter 2015.
<b>Noise levels /Vibration</b>	EPA ambient noise standards and worldwide vibration standards.	Noise: Noise prone activities are avoided during night time. No open blasting occurs during quiet hours. Excavators and all heavy machines are lubricated in a routine matter to minimize the noise and to increase the life of equipment  Vibration: EPC is more concerned regarding factors of human comfort and structural damage and always try to comply with allowable vibration standards. Blasting checklist is used by HSE staff.	Noise level and vibration record is maintained on daily bases after each blast

<b>Soil quality</b>	EPA quality standard (Different standards for each Parameter)	No environmental incident except small soil contamination has been observed.	Visual observations mitigation was done by removing the contaminated soil cover
<b>Flora</b>	Visual observations by relevant Forest professional during EIA study.	Study /monitoring during previous quarter undertaken	Study undertaken in December( <b>Annex- 09</b> )
<b>Fish Fauna</b>	Observation by relevant wildlife & Fisheries professional during EIA study.	Study /monitoring for last quarter undertaken	Study undertaken in March 2015 ( <b>Annex-08</b> )

**b. Occupational health and safety**

Health and safety of workers has been a prime consideration of project. In accordance with the safety standards all workers working at site are provided with the Personal Protective Equipment comprising of hard hats, safety shoes, and jacket and 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. All sub-Contractors have issued necessary PPEs to employees. Also, daily site inspections are undertaken to ensure the implementation. Community Safety Health and Security:

1. Consistent supervision on surge shaft access road and power house protection works was ensured.
2. Waste management training sessions were held for supervisors and relevant personnel. Furthermore, waste segregation methods were practically taught to site workers and staff to adopt appropriate mechanism.
3. Water sprinkling on project access road for workers /community health and safety
4. Water filter plant is installed for drinking water by Daewoo EPCC at camp residence to provide clean & pure water. Filter Plant cartridges are being replaced quarterly to have better quality of water.



New cartridges being installed at the filter Plant

5. During quarter, coordination meetings, monitoring and inspections were undertaken jointly by EPCC and OE's HSE staff with regard to site HSE status,. No dumping of excavated material was allowed on unapproved sites.
6. Waste segregation, collection, transportation and disposal mechanism has been improved during the month and full time waste collectors were placed on both sites. Waste management training sessions were held for supervisors and relevant personnel.
7. Sign boards have been made and placed on the site where there is a need to aware people while doing work.
8. It is being ensured that landfill is carried out in such a manner that it does not cause harm to the environment. This can be done by ensuring that landfills are located, designed, constructed, operated and restored so as to ensure that ground and surface waters are not contaminated.





*Training for Kyoung Dong's Workers and Supervisor on "Noise and Water Pollution". Trainees were made aware of different types of pollution its effects on the Human Health*

**c. CO<sub>2</sub> emissions by the Project**

Following Project activities are likely to produce CO<sub>2</sub> emissions, which were given due consideration and following mitigating measures were adopted to minimize the CO<sub>2</sub> emissions.

**Table: Sources of CO<sub>2</sub>**

Sources of CO <sub>2</sub>	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 <sub>2</sub> the Project Site atmosphere as trees acted as CO <sub>2</sub> 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 <sub>2</sub> and CH <sub>4</sub> in the atmosphere. For temporary storage of waste proper waste collection and storage areas have been designated. During last month of the reporting quarter waste management mechanism was improved
Use of Construction machinery	Regular inspections of machinery are practiced by HSE staff to check machinery conditions. Warning letters have been issued by OE and EPCC to the smoke producing and vehicles
Usage of liquid fuel	Liquid fuel used at different project activities amounts the maximum CO <sub>2</sub> emissions by the project
Emissions from electricity use	Electrical appliances release some trace amount of gases in order to mitigate that, it is in company's policy to switch off all the electrical appliances when not in use

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

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

- a. Plan for Disposal of Excavated Material
- b. Plan for Waste Management
- c. Plan for Traffic Management
- d. Social uplift plan

**a- Plan for Disposal of Excavated Material**

Excavated material is being disposed off in excavated waste disposal area approved as per EIA. At lower site, embankment and gabion walls were washed away due to flash flood on 5<sup>th</sup> September 2014. Reconstruction of damaged structures has now been completed during the reporting quarter. Whereas, upper site no embankment has yet been developed.

**b- Plan for Waste Management**

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



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



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

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

First step that has been followed so far in managing our Project Waste was the collection of all waste from all points of the site. Then, all the waste from different points are transported to the disposal area and placed in the trench. Next step of segregation has been attempted, in which cardboard, plastic bottles, paper and plastic sheet has been segregated. Then, waste has been transported to Scrap Yard where signature for evidence from waste collector, waste handler/transporter and scrap dealer has been taken on the "Waste Consignment Note" of Waste Management Plan. Thus, most of the Project Waste has been reused and recycled by selling it to the scrap dealer. Some of the items were of "Reusable's" that are used again by a different user or for a different purpose, like a jacket, shoes or a jar used for a cup. They are not reprocessed into raw materials. Whereas some of our Project Waste includes "Recyclables" that are materials like glass, metal and paper that are collected, separated, processed back into raw materials, and made into new products. Final step of Waste Compaction other than segregated waste has been done which is the process of compacting waste, reducing it in size. Wheel loader has been used for compressing waste so that more of it can be stored in the same space. Excavator has also been used to spread the waste evenly in layers over the landfill, and to compact waste to reduce its volume and help stabilize the landfill.

#### **c- Plan for Traffic Management**

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

#### **d- Social uplift plan**

Revised social uplift plan (SUP) was submitted by EPCC to SHPL in March 2013. Besides SUP various activities have also been undertaken to facilitate locals such as subletting works, supply of construction material. Status of SUP has been given in **(Annex-10)**.

**j. Resettlement Plan Implementation****i. Scope of Land Acquisition and Resettlement Impacts**

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

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

**SUMMARY OF THE LAND TO BE ACQUIRED ON AJK AND KPK**

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

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

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

**Summary of Land Acquisition Progress and compensation payments**

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

\*The number of persons who received the payment is higher than the number of affected persons is due to the repetition of the owners names in the payment vouchers<sup>1</sup>



**k. Resettlement and Reconstruction**

Living standards have been improved due to better compensation received and economic activities in the project vicinity. PAPs who lost their houses had utilized compensation amount in reconstruction of houses. Others have made investment in alternative lands in urban areas for better facilities. Furthermore, locals from adjacent villages have established small businesses like shops and canteens.



*Shops running by locals adjacent to project site*



*Restaurant and shop running by Imran family in Sarati village*

**l. Resettlement Related Consultation and Disclosure Activities and Grievance Procedures**

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

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

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



meanwhile, in cooperation with the relevant authorities, ensure that grievances are recorded and addressed following the timeframe in the RP.

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**

## **Non Occupational Fatality (Initial Report)**

# **INITIAL INCIDENT REPORT**

**25-03- 2015**

***PAKISTAN PATRIND HYDRO POWER PROJECT***



## INITIAL INCIDENT REPORT

<b>Name of Immediate Site Construction Manager:</b> Mr. Jun		
<b>1. Date :</b> 24-03- 2015	<b>2. Time :</b> 19 : 00	<b>3. Location :</b> Power House Area
<b>4. Type of Incident :</b> Non- Occupational Fatality		<b>5. Nationality :</b> Pakistani
<b>6. Name of Involved Person :</b> M. Rashid		<b>7. Job Title :</b> Rigger
<p><b>8. Incident Detailed Description :</b></p> <p>Based on the gathered information at the scene of the incident, Mr. Rashid (Late) and Mr. Junaid (tower crane operator) were busy in erection of the tower, after finishing their duty, at 19:00, (After the shift hours) they were returning back to camp from the tower crane, Mr. Rashid came down from the operators cabin through ladder and stopped 40 ft. height above the ground, and suddenly fell down and Died on the spot. <i>(As described by the witness Mr. Junaid, Witness Statement attached).</i></p> <p>Mr. Junaid reached at him and called for Help, Ambulance and HSE representatives arrived at the scene of the incident and transferred the IP in the ambulance, when the ambulance arrived at the gate, the site nurse checked the IP at the gate of the main camp, he found that there was no pulse in the body and declared him dead. <i>(Statement is attached).</i></p> <p>The Dead body was send directly to the hospital ( AIMS Hospital, Ambore, Muzaffarabad AJK) from the gate of the camp office, accompanied by the male nurse, Kyung Dong HSE Engineer, EPCC HSE representative and the foreman of the Deceased person.</p> <p>With in twenty eight minutes (28 minutes) the dead body reached the hospital, during the detailed examination of Mr. Rashid (Late) at the AIMS hospital, Doctor <b>(Mr. Sarwar Shabbir Qureshi)</b> declared that he had primarily got <b>Cardiopulmonary Arrest</b>, he died on the spot and fell down.</p> <p>The detailed report of the doctor's examination shows that the Apparent causes of the death were;</p> <ol style="list-style-type: none"> <li>1. Primary cause was Cardiopulmonary Arrest. <i>(Heart &amp; Lungs failure).</i></li> <li>2. Suspected secondary cause was the intra cranial bleed. <i>( Internal Bleeding from brain)</i></li> </ol> <p>Also the deceased person received multiple injuries after falling from the ladder of the crane, including broken limbs (both), broken Arm (Left) and spinal injuries.</p>		
<p><b>9. Witness of the Incident:</b></p> <p>1. Mr. M. Junaid. 2. Mr. Mehboob Shabab Mir. 3. Mir Mehboob.</p>		
<p><b>10. Immediate Action Taken:</b></p> <ul style="list-style-type: none"> <li>• Mr. Rashid was immediately sent to hospital.</li> <li>• The HSE Department was notified instantaneously about this incident.</li> <li>• An initial investigation was conducted immediately.</li> <li>• The operations in the area were also temporarily suspended.</li> </ul>		

**11. Corrective Action to be taken :**

1. All workers were informed that all the workers shall have regular medical checkups.
2. Disseminate the information about the incident to all workers and the lessons learned from the incident through Tool Box Talks/Meetings.

REPORTED BY:



Mr. Kamran Hassan Janjua, HSE Engineer

NOTED BY:



Mr. Choung, HSE Manager



Rashid Ali

Age - 22 years

7:40 PM  
25-3-15

History of fall from Height while  
working in Hydel Power Company.

O/E - BP - Nil

- Pulse - Nil

- Pupils - dilated

- On ECG - No cardiac activity

- Compound Fracture of both lower legs Tibia/fibula

- Bleeding from nose

⇒ Pt expired before reaching AIMS hospital EL

Apparent cause

- Cardiopulmonary arrest  
suspected after cranial bleed

Date and Time

- 25-3-15 at around 7:20 PM  
at ~~7:40 PM~~

Dr. Sarwar Sahir Qureshi  
Medical Officer AIMS MZD

Dr. Sarwar

## WITNESS STATEMENT

NAME	Mir Mehbub	TRADE	Interpreter	ID NO.	822033754336-7
SUPERVISOR	Mr. Lee	SECTION	Construction	DATE OF BIRTH	22-12-1975
DATE/TIME	25-03-2015				

BRIEF DESCRIPTION : According to 5W1H principle (when, where, who, what, why, how)

ٹائم شام 07:05 بجے ریگولر مشن کر کے فارغ ہو چکے تھے کہ گرنے لگی ایک کراڈز آئی، سوڑے دیکھا تو راشد جو کہ ٹاور کریمن نمبر 2 کا ریگولر تھا، ٹاور کریمن سے پیچھے کر گیا تھا۔ اس کا کہنا (میر محبوب) نے چند ساتھیوں کی مدد سے سائڈ پر لایا اور HSE کا ویٹ کرنے لگے۔ بعد ازاں ایمپولینس HSE والے نے کو اسٹے اور راشد کو ایمپولینس میں ڈالا اور ہسپتال لے گئے۔



## WITNESS STATEMENT

NAME	Kashif Javed	TRADE	H.S.E	ID NO.	82203-9238033-9
SUPERVISOR	Yasir Ghannai	SECTION	HSE	DATE OF BIRTH	26-11-1992
DATE/TIME	25-03-2015				

BRIEF DESCRIPTION : According to 5W1H principle (when, where, who, what, why, how)

سہ 07:07 پر میں PC panned slope پر چیک کرنے کے بعد میں  
میں پاور پلڈس لٹر سائٹ پر آ رہا تھا کہ یاسر Dong H.S.E کا فون  
آیا کہ ٹاور کمرے سے ریگرو پیچے گئے ہیں۔ میں نے فوراً  
ایمبولینس کو کال کی لیکن نیٹ ورک پر ابلیج کا بناء پر کال نہ مل سکی  
میں خود بھاگ کر ایمبولینس تک رسائی حاصل کی اور ایمبولینس  
کو سائٹ پر لے کر آیا، اور راشد جو کہ ٹریٹیا ہے یہو مٹی  
کی حالت میں تھا کہ ایمبولینس میں ملال اور امیور  
ہسپتال منتقل کیا۔

کاشف ج

## WITNESS STATEMENT

NAME/ SIGNATURE	M. Junaid	TRADE	Crane operator	ID NO.	36501-0857267-5
SUPERVISOR	M. Boota	SECTION	Construction	DATE OF BIRTH	
DATE/TIME	25th March 2015				

**BRIEF DESCRIPTION** : Accoding to 5W1H principle(when,where,who,what,why,how)

Muhammad Junaid CNIC # 36501-0857267-5 at 7:00 pm Mr. Rashid was coming down from the cabin of the tower crane and Mr. Junaid was in the in the cabin. Mr. junaid see at approx the height of 40 feet Mr. Junaid was stop while going down from the stair and suddenly Mr. Junaid listen the sound that something drop from the height when he see down it was Rashid lay down on the ground unconsciously. Mr. Junaid immediately call help and we wait ambulance and after we take to the hospital and doctor told that he was dead on the spot.

SF033

Revision : 0

STATEMENT

Cell No.

0312-9074783

Age approx 26-27 Years.

WITNESS:-

~~NO. 2 STATEMENT -~~ ~~NO. 2~~ - Muhammad Junaid - CNIC: 36502-0857267-5

At 7:00 PM MR RASHID was coming down from the cabin of tower crane and MR Junaid was in the cabin.

MR Junaid saw at approx the height of 40 feet MR Rashid was stop while going down from stairs and suddenly MR Junaid listen the sound that something drop from height when he see down it was Rashid land down on the ground unconscious. MR Junaid immediately call help and we wait 20-25 min for ambulance and after approaching ambulance we take him to hospital and doctor told that he was dead on the spot.

M. Junaid

STATEMENT TAKEN BY: KAMRAN JANJUA.

Kamran Janjua

PPE:- ~~Hard~~ Hard Hat, Shoe Safety and Gloves.  
Visible jacket.

<b>WITNESS STATEMENT</b>					
NAME/ SIGNATURE	Asif Akmal <i>(Signature)</i>	TRADE	Male Nurse	ID NO.	82203-976172-5
SUPERVISOR	Dr. Bilal	SECTION	HSE	DATE OF BIRTH	23/12/1971
DATE/TIME	25/3/15				
<p><b>BRIEF DESCRIPTION</b> : According to 5W1H principle (when, where, who, what, why, how)</p> <p>At about 07:10 pm, I received the information that there has been an incident of fall from height at the power house area.</p> <p>I immediately came out and was going to site, but when I reached the gate of Camp office I was informed that patient is coming to office via ambulance.</p> <p>When ambulance arrived I checked him. There was no pulse, no breathing, no carotid, pupil were b/lc fixed non reactive &amp; he was already dead.</p> <p>I accompanied the dead body to AIMS hospital and handed over to hospital staff.</p> <p align="right"><i>(Signature)</i></p>					

SF033

Revision : 0

# **Annex-2**

## **ANNUAL BLOOD SCREENING/ EXAMINATION**



**Environmental & Social Monitoring Report (January-March 2015)**

Sr.	Inspection	By	Date			Location	Details
			Day	Month	Year		
1	Fire Extinguishers Inspection	HSE Staff	1	1	2015	Power House site	Inspection of fire extinguishers In HSE manager office, camp office, inner side office, corridor, kitchen outer side, camp, generator area, chiller, main entrance, PM office, HSE training hall, right wing, welding shop, operator cabin, residence, weigh bridge, Malik House (Rental) workshop area, surge shaft.
2	Daily HSE Inspection	HSE Staff	1	1	2015	Power House site	Daily HSE Inspection on powerhouse site.
3	Daily HSE Inspection	HSE Staff	2	1	2015	Power House site	Daily HSE Inspection on powerhouse site.
4	Heavy equipment inspection	HSE Staff	9	1	2015	Power House site	Inspection of Kyung dong's Heavy Equipment (Low bed trailer, Model: 1998, Equipment No: C-1475 Operator: Ali Asghar Shah) at Powerhouse Site.
5	Heavy equipment inspection	HSE Staff	9	1	2015	Power House site	Inspection of Kyung dong's Heavy Equipment (Low bed trailer, Model: 2006, Equipment No: TKM-401 Operator: Irfan-ullah) at Powerhouse Site.
6	Color Coding	HSE Staff	8	1	2015	Power House site	Color Coding activity held at powerhouse site for all tools and equipment's for the first quarter of 2015.
7	Heavy Machine/Equipment	HSE Staff	10	1	2015	Power House site	Inspection of Kyung dong's Heavy Equipment (Mobile Crane) at Powerhouse Site.

*Environmental & Social Monitoring Report (January-March 2015)*

8	Batching Plant Inspection	HSE Staff	10	1	2015	Power House site	Inspection of the new batching plant at Powerhouse site.
9	Heavy Machine/Equipment	HSE Staff	10	1	2015	Power House site	Inspection Documents of Hydraulic Crane held at November 29, 2014, received at 10-01-2015, Certificate issued for the inspection.
10	Color Coding	HSE Staff	13	1	2015	Power House site	Color Coding activity held at powerhouse site for all tools and equipment (remaining) for the first quarter 2015.
11	Blasting Inspection	HSE Staff	1	1	2015	Upper Site	Inspection of blasting activity.
12	Batching plant inspection	HSE Staff	2	1	2015	Upper Site	Inspection of NBP at the weir site.
13	Blasting inspection	HSE Staff	2	1	2015	Upper Site	Inspection of blasting activity.
14	PPE inspection	A/M HSE	2	1	2015	Upper Site	Some of the workers were without safety jacket & chin strip
15	Fire extinguisher inspection	HSE Staff	3	1	2015	Upper Site	inspection of fire extinguishers held at weir site, Re: Satisfactory (all tags changed )
16	Blasting Inspection	HSE Staff	5	1	2015	Upper site	Inspection of blasting activity.
17	Blasting Inspection	HSE Staff	5	1	2015	Upper Site	Inspection of blasting activity.
18	Blasting Inspection	HSE Staff	5	1	2015	Upper Site	Inspection of blasting activity.
19	Blasting Inspection	HSE Staff	6	1	2015	Upper Site	Some lights are missing in HRT.
20	Blasting Inspection	HSE Staff	6	1	2015	Upper Site	Inspection of blasting activity.
21	Blasting Inspection	HSE Staff	7	1	2015	Upper Site	Inspection of blasting activity.
22	Fire extinguisher inspection	HSE Staff	8	1	2015	Upper Site	Inspection of fire extinguishers held at weir site, Re: Satisfactory (all tags changed )
23	PPE inspection at new	HSE Staff	8	1	2015	Upper Site	Some workers found without visibility jackets.

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	batching plant						
24	Blasting inspection	HSE Staff	8	1	2015	Upper Site	Inspection of blasting activity.
25	Fire extinguisher inspection	HSE Staff	9	1	2015	Upper Site	Inspection of fire extinguishers held at weir site, Re: Satisfactory (all tags changed )
26	Blasting inspection	HSE Staff	9	1	2015	Upper Site	Inspection of blasting activity.
27	Blasting inspection	HSE Staff	9	1	2015	Upper Site	Inspection of blasting activity.
28	Heavy Equipment inspection	HSE Staff	9	1	2015	Upper Site	Repairing required for some of the equipment
29	Fire extinguisher inspection.	HSE Staff	9	1	2015	Upper Site	Inspection of fire extinguishers held at weir site, Re: Satisfactory (all tags changed )
30	Blasting inspection	HSE Staff	10	1	2015	Upper Site	Inspection of blasting activity.
31	Blasting inspection	HSE Staff	10	1	2015	Upper Site	Inspection of blasting activity.
32	Blasting inspection	HSE Staff	11	1	2015	Upper Site	Inspection of blasting activity.
33	Blasting inspection	HSE Staff	11	1	2015	Upper Site	Inspection of blasting activity.
34	Oxygen cylinder inspection	HSE Staff	11	1	2015	Upper Site	Glass of gauge observed damaged.
35	Color Coding	HSE Staff	12	1	2015	Upper Site	Color coding activity carried out for Hand and power tools (weir site) for first quarter 2015
36	Color Coding	HSE Staff	11	1	2015	Upper Site	A few of the equipment's that are out of work have been tagged with ( Do not use-Red Tag).
37	Blasting inspection	HSE Staff	12	1	2015	Upper Site	Inspection of blasting activity.
38	Blasting inspection	HSE Staff	12	1	2015	Upper Site	Inspection of blasting activity.
39	Explosive issue inspection	HSE Staff	12	1	2015	Upper Site	Inspection carried out for the Issuance, inventory, handlers and transportation of explosive materials on weir site
40	Electrical inspection	HSE Staff	13	1	2015	Upper Site	Color coding activity carried out on Electrical equipment's (weir

**Environmental & Social Monitoring Report (January-March 2015)**

							site) for first quarter 2015
41	cables inspection	HSE Staff	13	1	2015	Upper Site	Satisfactory.
42	Heavy equipment inspection	Assistant Manager HSE	13	1	2015	Upper Site	Inspection of heavy equipment's of HI-TECH carried out on weir site
43	Color Coding	HSE Staff	14	1	2015	Upper Site	Color coding activity carried out for tools and equipment (weir site) for first quarter 2015
44	Power Generator inspection	HSE Staff	14	1	2015	Upper Site	Inspection carried out at weir site, grounding required at some points
45	Blasting Inspection	HSE Staff	15	1	2015	Upper Site	Inspection of blasting activities on weir site carried out, HSE staff observed everything satisfactory being done there.
46	Blasting Inspection	HSE Staff	16	1	2015	Upper Site	Inspection of blasting activities on weir site carried out, HSE staff observed everything satisfactory being done there
47	Welding plant inspection	HSE Staff	16	1	2015	Upper Site	Satisfactory.
48	Blasting inspection	HSE Staff	17	1	2015	Upper Site	Inspection of blasting activity.
49	Blasting inspection	HSE Staff	17	1	2015	Upper Site	Inspection of blasting activity.
50	Blasting inspection	HSE Staff	18	1	2015	Upper Site	Inspection of blasting activity.
51	Blasting inspection	HSE Staff	18	1	2015	Upper Site	Inspection of blasting activity.
52	Blasting inspection	HSE Staff	18	1	2015	Upper Site	Inspection of blasting activity.
53	Blasting inspection	HSE Staff	18	1	2015	Upper Site	Inspection of blasting activity.
54	Blasting inspection	HSE Staff	19	1	2015	Upper Site	Inspection of blasting activity.
55	Explosive issue inspection	HSE Staff	19	1	2015	Upper Site	Satisfactory.
56	Environment inspection	HSE Staff	19	1	2015	Upper Site	Satisfactory.
57	Gas & Fuel equipment	HSE Staff	19	1	2015	Upper Site	Flash back arrestor was missing & some falling object was lying

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	inspection						in the lifting trolley.
58	Blasting inspection	HSE Staff	20	1	2015	Upper Site	Inspection of blasting activity.
59	Blasting inspection	HSE Staff	20	1	2015	Upper site	Inspection of blasting activity.
60	Explosive issue inspection	HSE Staff	20	1	2015	Upper Site	Satisfactory.
61	Waste segregation	HSE Staff	20	1	2015	Upper Site	Tool box arranged for avoiding the pollutions.
62	Electrical system	HSE Staff	21	1	2015	Upper Site	Inspection of portable generator carried out at weir site, it is noticed that the pad, grounding and barricading has not been arranged properly.
63	Environment inspection	HSE Staff	21	1	2015	Upper Site	Satisfactory.
64	Blasting Inspection	HSE Staff	21	1	2015	Upper Site	Satisfactory.
65	Explosive issue inspection	HSE Staff	21	1	2015	Upper Site	Satisfactory.
66	Environment inspection	HSE Staff	22	1	2015	Upper Site	Poor material arrangement housekeeping issues were found on weir pit area
67	Batching Plant inspection	HSE Staff	22	1	2015	Upper Site	Inspection carried out at weir site, some oil spillage & loose flinch of cement cello was observed.
68	Blasting Inspection	HSE Staff	22	1	2015	Upper Site	Satisfactory.
69	Heavy equipment inspection	HSE Staff	23	1	2015	Upper Site	Satisfactory.
70	Scaffolding inspection	HSE Staff	24	1	2015	Upper Site	Many issues were found in the checklist & instructed to supervisor to re-erect the scaffold.
71	Blasting Inspection	HSE Staff	24	1	2015	Upper Site	Satisfactory.
72	Explosive issue inspection	HSE Staff	24	1	2015	Upper Site	Satisfactory.
73	Excavation inspection	HSE Staff	25	1	2015	Upper Site	Satisfactory.
74	Hygienic inspection	HSE Staff	26	1	2015	Upper Site	Satisfactory.

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75	Blasting inspection	HSE Staff	26	1	2015	Upper Site	Satisfactory.
76	Power generator inspection	HSE Staff	26	1	2015	Upper Site	Satisfactory.
77	Waste collection inspection	HSE Staff	27	1	2015	Upper Site	Satisfactory.
78	Blasting inspection	HSE Staff	27	1	2015	Upper Site	Satisfactory.
79	Oxygen & fuel inspection	HSE Staff	27	1	2015	Upper Site	Satisfactory.
80	Blasting inspection	HSE Staff	28	1	2015	Upper Site	Satisfactory.
81	Environment inspection	HSE Staff	28	1	2015	Upper Site	Satisfactory.
82	Cargo P.t inspection	HSE Staff	28	1	2015	Upper Site	Satisfactory.
83	Hygienic inspection	HSE Staff	29	1	2015	Upper Site	Satisfactory.
84	Blasting inspection	HSE Staff	29	1	2015	Upper Site	Satisfactory.
85	Blasting inspection	HSE Staff	30	1	2015	Upper Site	Satisfactory.
86	Environment inspection	HSE Staff	30	1	2015	Upper Site	Satisfactory.
87	Heavy equipment	HSE Staff	31	1	2015	Upper Site	Satisfactory.
88	Hygienic inspection	HSE Staff	31	1	2015	Upper Site	Satisfactory.
89	Explosive inspection	HSE Staff	31	1	2015	Upper Site	Satisfactory.
90	Heavy Equipment inspection	HSE Staff	1	2	2015	Weir site	Inspection of air compressor carried out at weir site, the tire was found damaged and hook welded.
91	Blasting inspection	HSE Staff	1	2	2015	Weir site	Satisfactory
92	Environment inspection	HSE Staff	2	2	2015	Weir Site	Satisfactory
93	Blasting inspection	HSE Staff	2	2	2015	Weir site	Satisfactory
94	Blasting inspection	HSE Staff	2	2	2015	Weir site	Satisfactory

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95	Excavation inspection	HSE Staff	2	2	2015	Weir site	Satisfactory
96	Ladder inspection	HSE Staff	3	2	2015	Weir site	Satisfactory
97	Environment inspection	HSE Staff	3	2	2015	Weir site	Satisfactory
98	Blasting Inspection	HSE Staff	3	2	2015	Weir site	Satisfactory
99	PPE inspection	HSE Staff	4	2	2015	Upper Site	Satisfactory
100	Blasting inspection	HSE Staff	4	2	2015	Upper Site	Satisfactory
101	Excavation inspection	HSE Staff	4	2	2015	Upper Site	Satisfactory
102	waste segregation	HSE Staff	4	2	2015	Upper Site	Satisfactory
103	Electrical inspection	HSE Staff	5	2	2015	Upper site	Satisfactory
104	Blasting Inspection	HSE Staff	5	2	2015	Upper Site	Satisfactory
105	Fire Extinguishers Inspection	HSE Staff	5	2	2015	Power House site	Inspection of fire extinguishers In HSE manager office, camp office, inner side office, corridor, kitchen outer side, camp, generator area, chiller, main entrance, PM office, HSE training hall, right wing, welding shop, operator cabin, residence, weigh bridge, Malik House (Rental) workshop area, surge shaft.
106	PTW inspection	HSE Staff	6	2	2015	Upper Site	Satisfactory
107	Blasting Inspection	HSE Staff	6	2	2015	Upper Site	Inspection of blasting activity.
108	Environment inspection	HSE Staff	7	2	2015	Upper Site	Satisfactory
109	Heavy Equipment inspection	HSE Staff	7	2	2015	Upper Site	Inspection of aggregate washing plant being done at weir site, some moving parts were found without safe guard , so recommended to incharge to install the safe guard .
110	Blasting inspection	HSE Staff	7	2	2015	Upper Site	Satisfactory
111	PTW Inspection	HSE Staff	8	2	2015	Upper Site	Satisfactory



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112	Excavation inspection	HSE Staff	8	2	2015	Upper Site	Removed all the loose rolling stone from the edges.
113	Batching plant inspection	HSE Staff	9	2	2015	Upper Site	Some workers have been found without PPEs.
114	Environment inspection	HSE Staff	10	2	2015	Upper Site	Satisfactory
115	Ladder inspection	HSE Staff	10	2	2015	Upper Site	Rungs were damaged & in poor condition, removed the ladder from site.
116	Lifting inspection .	HSE Staff	11	2	2015	Upper Site	It was needed to place the proper rigger & tag line
117	Environment inspection	HSE Staff	11	2	2015	Upper Site	Satisfactory
118	Gas cutter & gas cylinder inspection.	HSE Staff	11	2	2015	Upper Site	Satisfactory
119	Heavy equipment inspection	HSE Staff	12	2	2015	Upper Site	Satisfactory
120	Environment inspection	HSE Staff	12	2	2015	Upper Site	Satisfactory
121	Ladder inspection	HSE Staff	13	2	2015	Upper Site	Rugs were damaged & in poor condition, removed the ladder from site.
122	Environment inspection	HSE Staff	13	2	2015	Upper Site	Satisfactory
123	Lifting bucket inspection	HSE Staff	14	2	2015	Upper Site	Satisfactory
124	Blasting Inspection	HSE Staff	14	2	2015	Upper Site	Satisfactory
125	Blasting Inspection	HSE Staff	15	2	2015	Upper Site	Satisfactory
126	Permit to work inspection	HSE Staff	16	2	2015	Upper Site	Over righting was observed on permit to work format that is not allowed.
127	Site inspection	HSE Staff	16	2	2015	Upper Site	Inspection regarding excavation activity carried out on weir site, placed the barricading on the loose edges
128	Site inspection	HSE Staff	16	2	2015	Upper Site	Satisfactory.
129	Oxygen Cylinder Inspection	HSE Staff	16	2	2015	Upper Site	Arranged the lifting trolley.

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130	Batching Plant Inspection	HSE Staff	17	2	2015	Upper Site	Needs to cover the scrap with plastic sheet.
131	Blasting Inspection	HSE Staff	18	2	2015	Upper Site	Satisfactory.
132	Site inspection	HSE Staff	18	2	2015	Upper Site	Satisfactory.
133	Lifting Equipment Inspection	HSE Staff	19	2	2015	Upper Site	Satisfactory.
134	site inspection	HSE Staff	19	2	2015	Upper Site	Satisfactory.
135	Blasting Inspection	HSE Staff	20	2	2015	Upper Site	Satisfactory
136	Heavy Machine/Equipment	HSE Staff	21	2	2015	Upper Site	Satisfactory
137	Site inspection	HSE Staff	22	2	2015	Upper Site	Satisfactory
138	Site inspection	HSE Staff	22	2	2015	Upper Site	Satisfactory
139	Blasting Inspection	HSE Staff	23	2	2015	Upper Site	Satisfactory
140	Environment inspection	HSE Staff	23	2	2015	Upper Site	oil spillage was observed
141	Environment inspection	HSE Staff	24	2	2015	Upper Site	Satisfactory
142	Ladder inspection	HSE Staff	25	2	2015	Upper Site	Satisfactory.
143	Environment inspection	HSE Staff	26	2	2015	Upper Site	Satisfactory.
144	Batching plant inspection	HSE Staff	26	2	2015	Upper Site	Oil spillage was observed
145	Environment inspection	HSE Staff	27	2	2015	Upper Site	Satisfactory
146	Heavy Machine/Equipments	HSE Staff	28	2	2015	Power House site	Inspection Documents of Hydraulic Crane held at January 28, 2015, received at February 28, 2015, Inspection documents attached.
147	Fire Extinguishers Inspection	HSE Staff	5	3	2015	Power House site	Inspection of fire extinguishers In HSE manager office, camp office, inner side office, corridor, kitchen outer side, camp, generator area, chiller, main entrance, PM office, HSE training hall, right wing, welding shop, operator cabin, residence, weigh

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							bridge, Malik House (Rental) workshop area, surge shaft.
148	Heavy Machine/Equipment	HSE Staff	5	3	2015	Power House site	Inspection of Kyung Dong's Heavy Equipment (Excavator EX-200) at Powerhouse Site.
149	Heavy Equipment inspection	Third Party	15	3	2015	Power House site	External inspection of heavy machine / equipment (1- Tower Crane 60x60 meters, 2- Tower Crane 70x70 meters, 3- Charging Car(S-528 Dicci Shotcrete), 4- Charging Car (S-356 /Dicci Shotcrete), 5- Charging Car (S-344 Dicci Shotcrete), 6- Charging Car (S-327 Dicci Shotcrete), 7- Charging Car (1604-96 Hydra Lift Drill Unit), 8- Charging Car (1610-97 Hydra Lift Drill Unit), 9- Charging Car (1608-97 Hydra Lift Drill Unit)) carried out on 12th-14th February 2015 (powerhouse site) and results have been received in current week- Evidence Documents Attached.
146	Gas Cylinder Inspection	HSE Staff	1	3	2015	Weir site	Gauge & needles were damaged & flash back arrester was missing.
147	Environment inspection	HSE Staff	1	3	2015	Weir Site	Inspection of environmental factors at weir site, results satisfactory
148	Batching Plant Inspection	HSE Staff	2	3	2015	Weir site	Need to barricade the area & safe guard around the moving parts of aggregate washing plant.
149	Environment inspection	HSE Staff	2	3	2015	Weir site	Inspection of waste segregation carried out at weir site
150	Electrical inspection	HSE Staff	6	3	2015	Weir site	Inspection of portable generator carried out at weir site, grounding and barricading required.
151	B/plant Inspection	HSE Staff	10	3	2015	Weir site	Complete the fence & safe guard as soon as possible.
152	Electrical inspection	HSE Staff	12	3	2015	Weir site	Inspection of power generator held at weir site, Poor cable arrangement & grounding was observed.
153	Waste segregation	HSE Staff	12	3	2015	Weir site	oil spillage & poor housekeeping was observed
154	Hand & Power tools inspection	HSE Staff	16	3	2015	Upper Site	Some tools were without color coding

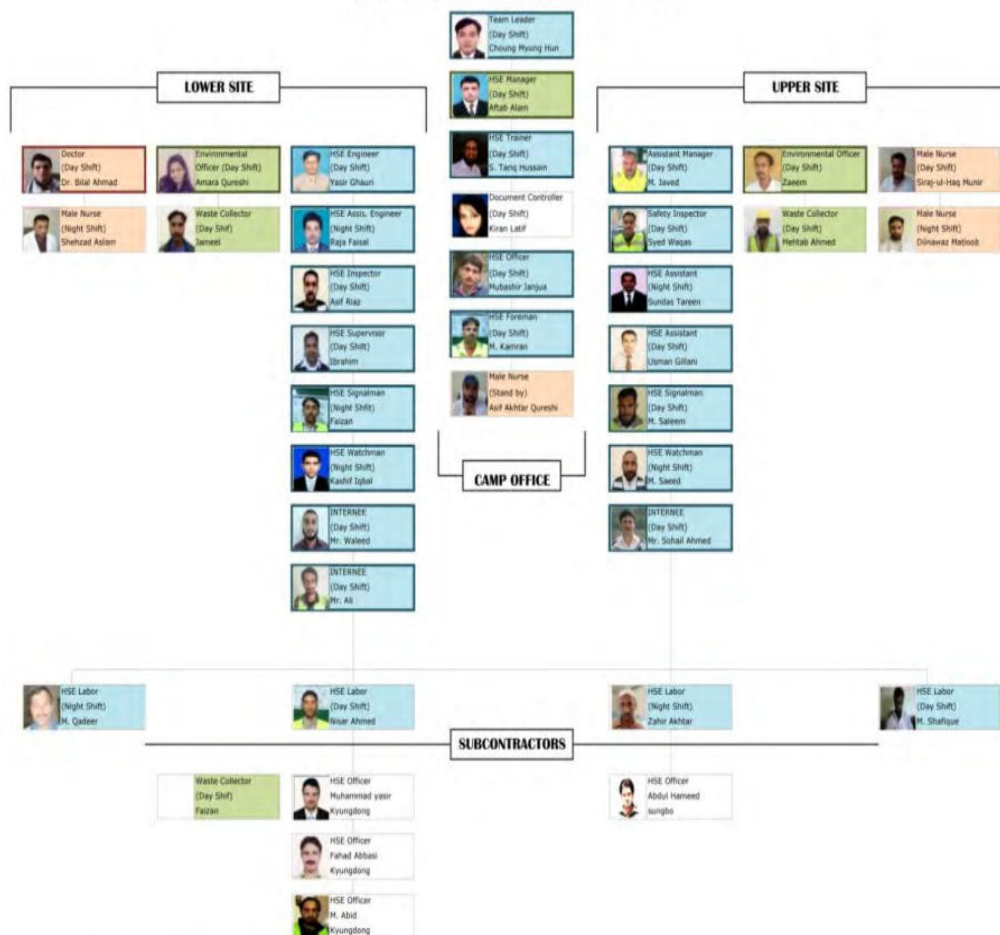
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155	Lifting Equipment Inspection	HSE Staff	16	3	2015	Upper Site	Improper and unapproved self-made lifting sling was found with IVCC Machinery.
156	Usage of Personal Protective Equipment	HSE Staff	17	3	2015	Upper Site	Instructed to workers to use the chin strip properly.
157	Blasting inspection	HSE Staff	18	3	2015	Upper Site	Some moving parts were without cover .recommended to install the safe guards.
158	Electrical inspection	HSE Staff	19	3	2015	Upper site	oil spillage & poor housekeeping was observed around power generator
159	Oxygen Cylinder Inspection	HSE Staff	20	3	2015	Upper Site	Flash back arrestors & trolley required.
160	HRT Inspection	HSE Staff	21	3	2015	Upper Site	Status board entry log not maintained properly So issued the warning letter to involved persons
161	Heavy equipment inspection	HSE Staff	23	3	2015	Upper Site	Hazard lights and main light was damaged.
162	Environment inspection	HSE Staff	23	3	2015	Upper Site	Dust was observed at main road due to inability of water bowser.
163	PPE inspection	HSE Staff	24	3	2015	Upper Site	Some workers were found without PPEs, issued the warning letters & fined them.
164	Power generator	HSE Staff	24	3	2015	Upper Site	Camp cleaning was not satisfactory.
165	Oxy & gas cutter inspection	HSE Staff	24	3	2015	Upper Site	Flash back arrestors & trolley required.
166	Heavy equipment inspection	HSE Staff	26	3	2015	Upper Site	Issues listed & discussed in weekly meeting.
167	Heavy equipment inspection	HSE Staff	28	3	2015	Upper Site	Side mirror was missing.
168	Crane inspection	HSE Staff	29	3	2015	Upper Site	Third party inspection required.

# **Annex-3**

## **HSE Organization**

## HSE ORGANIZATION CHART



### DAEWOO E&C

Camp Office:	Upper Site:	Lower Site:
Health=1	Health=2	Health=2
Safety=3	Safety=6+2	Safety=7+2
Environment=1	Environment=1+1	Environment=1+1

### SUBCONTRACTORS

Upper Site:	Lower Site:
Safety=3	Safety=1

	Safety	Health	Environment
Daewoo E&C+	16	5	3
Subcontractors	4	0	1
<b>Total</b>	<b>20</b>	<b>5</b>	<b>4</b>

Total Staff = 31

# **Annex-4**

## **WEEKLY MEETINGS**



*Environmental & Social Monitoring Report (January-March 2015)*

Sr.	Meeting	Location	Date	Agenda
1.	Weekly HSE Meeting with Subcontractors and Construction Team Lower Site.	HSE Training Hall Camp Office Powerhouse Site	06/01/2015	1- Fuel Tanks stored at the access road are unsafe 2- Excavator is used to lift & transfer the grout machines 3- Pickaway truck carries the material in unsafe manner 4- workers working at powerhouse slopes are not using the proper PPEs 5- Workers of Naveed Brothers are using the improper scaffold and working at height without any protection 6- Drill machine used at the powerhouse slopes is no having the dust control 7- There was no access at lathe workshop of kyungdong 8- The chemical bags at the access road should be disposed 9- Hard barricading should be repaired.
2.	Weekly HSE Meeting with subcontractors and construction team upper site	Camp office weir site	07/01/2015	Discussed all site safety issues with construction team & take time frame/date & signature for the completion.
3.	Weekly HSE Meeting with Subcontractors and Construction Team Lower Site.	HSE Training Hall Camp Office Powerhouse Site	13/01/2015	1- Electrical DPs and wiring, Access to water tank and material stored at surge shaft area are unsafe 2- Electrical system at powerhouse, access bridge and kyungdong area are unsafe 3- Some of the workers of Naveed Brothers observed working without PPEs and others with damaged PPEs 4- No flash back arrestors with gas cylinders 5- Some of the fire extinguishers found without inspection 6- Waste water, leakage of water and drinking water issues.
4.	Weekly HSE Meeting with subcontractors and construction team upper site	Camp office weir site	14/01/2015	Discussed all site safety issues with construction team & took time frame/ target date & verification for the completion of activities pointed out to be completed.
5.	Weekly HSE Meeting with Sub Contractors and Construction Team Upper Site.	Camp office weir site	21/01/2015	Discussed all site safety issues with construction teams & took time frame/ date for completion of follow up action signature for evidence.
6.	Weekly HSE Meeting with Subcontractors and Construction Team Lower	HSE Training Hall Camp Office Powerhouse Site	27/01/2015	1- All electric machines, cables & generators must be managed properly, grounding and isolation is must. 2- Housekeeping

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Sr.	Meeting	Location	Date	Agenda
	Site.			3- flash back arrestors for hot work 4- Induction Training and Provision of PPEs is must before starting the work 5- Proper erection of scaffolding 6- Implementation of excavation safety procedure 7- Proper management of waste.
7.	Weekly HSE Meeting with construction team upper site	Camp office weir site	28/01/2015	Discussed all site safety issues with construction team & took time frame/date for completion & signature for the completion.
8.	Weekly HSE Meeting with Subcontractors and Construction Team Lower Site.	HSE Training Hall Camp Office Powerhouse Site	03/02/2015	1- The Electrical DPs inside HRT found unsafe 2- Sludge inside HRT 3- Dust Control 4- Cleaning of Sedimentation tanks & bridge 5- Two activities shouldn't be carried out at the same time 6- Safe placement of transformer 7- Naveed brothers workers working at height without induction and PPEs 8- Proper access / egress 9-Hard barricading along dangerous ways.
9.	Weekly HSE Meeting with subcontractors and construction team upper site	Camp office weir site	4/02/2015	Discussed all the site safety issues with construction team & took time frame/ target date & evidence signatures of the responsible persons for the completion of follow up action.
10.	Weekly HSE Meeting with Subcontractors and Construction Team Lower Site.	HSE Training Hall Camp Office Powerhouse Site	10/02/2015	1- Grounding of all the electric machines should be ensured before making it functional 2- Tools & Equipments 3- Falling objects and road safety 4- Work at heights 5- Slip & Trip hazards 6- Oil spillage, site waste & environment issues 7- Third party inspection of tools and equipments.
11.	Weekly HSE Meeting with subcontractors and construction team upper site	Camp office weir site	11/02/2015	Discuss all site safety issues with construction team & take time frame/ Completion date & evidence signatures of concerned parties on target date.
12.	Weekly HSE Meeting with Subcontractors and Construction Team Lower Site.	HSE Training Hall Camp Office Powerhouse Site	17/02/2015	1- At surge shaft, Electric DPs are not safe and material needs proper arrangement 2- Kyungdong workers found working without PPEs 3- Loading techniques used by Daewoo transport are unsafe 4- gas cylinders found in unsafe condition 5- Unsafe material storage at third corner.

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Sr.	Meeting	Location	Date	Agenda
13.	Weekly HSE Meeting with Sub Contractors and Construction Team Upper Site.	Camp office weir site	18/02/2015	Discussed all site safety issues with construction teams & took time frame/date &signature for the completion.
14.	Weekly HSE Meeting with construction team upper site	Camp office weir site	25/02/2015	Discussed all site safety issues with construction team &took time frame/ target date & signatures for the completion.
15.	Weekly HSE Meeting with Subcontractors and Construction Team Lower Site.	HSE Training Hall Camp Office Powerhouse Site	03/03/2015	1- Unsafe Lifting 2- Fire Protection 3- Unsafe Platform 4- Gas Storage 5-Improper Gas Cylinders 6-Unsafe Electrical Conditions 5- Improper Electrical Arrangements 6- Unsafe Act 7- Unsafe equipment 8- Unsafe Electrical wiring 9- Lifting Equipment 10- Unsafe Access.
16.	Weekly HSE Meeting with Subcontractors and Construction Team Weir Site.	HSE Training Hall Camp Office Weir site	4/03/2015	Discussed all site safety issues with construction team & took time frame/date & signature for the completion of assigned activities in targeted date.
17.	Internal HSE Meeting	HSE Training Hall Camp Office Powerhouse Site	5/03/2015	Site HSE issues.
18.	Weekly HSE Meeting with Subcontractors and Construction Team Lower Site	HSE Training Hall Camp Office Powerhouse Site	10/03/2015	1- Unsafe Lifting 2- Unsafe Electrical Dps 3- Fire extinguishers 4- Unsafe Access 5- Unsafe Platform 6- Unsafe Storage 7- Unsafe Act and behavior 8- Damaged drain pipe 9- PPEs 10- Housekeeping and material arrangement 11- Sedimentation tank cleaning.

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Sr.	Meeting	Location	Date	Agenda
19.	Weekly HSE Meeting with subcontractors and construction team upper site	Camp office weir site	11/03/2015	Discussed all site safety issues with construction team & took time frame/date & signature for the completion of indicated activities.
20.	Weekly HSE Meeting with Subcontractors and Construction Team Lower Site	HSE Training Hall Camp Office Powerhouse Site	17/03/2015	1- Unsafe Lifting at powerhouse 2- Unsafe Tower Crane 3- Unsafe Access and platform 4- Material Storage 5- Poor Condition Dump Truck being used at the site 6- Gas cylinders without flashback arrestors 7- Welders should use face shield during welding 8- Electrical DP without grounding with domestic standard of electrical wiring 9- Crane activity should be properly monitored by a certified rigger all the time.
21.	Weekly HSE Meeting with construction team upper site	Camp office weir site	18/03/2015	Discussed all site safety issues with construction team & took time frame/ target date & signatures for the completion.
22.	Weekly HSE Meeting with Subcontractors and Construction Team Lower Site	HSE Training Hall Camp Office Powerhouse Site	24/03/2015	1- Arrangement of Proper storage of gas cylinders 2- Damaged Fire 3- Unsafe conditions caused due to PPEs 4- Unsafe Electrical Installations 5- Cleaning of sedimentations tanks 6-Unsafe material transportation 6- Housekeeping and material arrangement 7- Unsafe Grinding Discs 8- Exhaust ducts spreading hazardous gases at the face 9- Unsafe excavation of powerhouse area.
23.	Weekly HSE Meeting with construction team upper site	Camp office weir site	25/03/2015	Discussed all site safety issues with construction teams & took time frame/date & signature for the completion.
24.	HSE internal meeting	HSE Training Hall Camp Office Powerhouse Site	25/03/2015	Preparation of the daily observation reports.

# **Annex-5**

## **HSE TRAININGS**

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1	Banks-man Training	8	1	2015	S. Tariq	Lower Site	HSE Training Hall Camp Office	16	Daewoo E&C & Subcontractor.
2	Excavation Safety	16	1	2015	S. Tariq	Lower Site	HSE Training Hall Camp Office	12	Daewoo E&C.
3	Work at height	16	1	2015	S. Tariq	Lower Site	HSE Training Hall Camp Office	15	Naveed Brothers
4	Fire Fighting	16	1	2015	S. Tariq	Lower Site	HSE Training Hall Camp Office	15	Naveed Brothers
5	IOSH	27	1	2015	Inspire Training & Consultancy	Lower Site	HSE Training Hall Camp Office	15	Daewoo E&C
6	Health Safety Environment	29	1	2015	Aftab Alam	Lower Site	Kashmir Model School-Lower Site	751	School Children
7	Safe driving & Operating	11	1	2015	M.Javed	Upper Site	At site near the HRT. Weir site	11	Sungbo, Kyung dong & Daewoo
8	Work at height	10	1	2015	M. Javed	Upper Site	HSE OFFICE	20	Daewoo E&C and subcontractors staff
9	Scaffolding Safety	31	1	2015	M. Javed	Upper Site	HSE Training Hall Camp Office	17	Sungbo.
10	Work at height	6	2	2015	Choung Myun Hun	Lower Site	HSE Training Hall Camp Office	21	Korean Staff
11	Lessons learnt from Accident	11	2	2015	M.Javed	Weir Site	HSE Training Hall Camp Office	12	Daewoo E&C.
12	Rescue Drill	11	2	2015	S. Tariq	Lower Site	HSE Training Hall Camp Office	21	Korean staff



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13	HSE Counseling	11	2	2015	S. Tariq	Lower Site	HSE Training Hall Camp Office	2	Daewoo E&C
14	HSE Counseling	11	2	2015	S. Tariq	Lower Site	HSE Training Hall Camp Office	2	Daewoo E&C
15	Excavation Safety	12	2	2015	S. Tariq	Lower Site	HSE Training Hall Camp Office	46	Daewoo and subcontractors
16	Noise Pollution & Water Pollution	12	2	2015	Ammara Nazir	Lower Site	HSE Training Hall Camp Office	46	Daewoo E&C and subcontractors.
17	Concrete work safety	18	2	2015	Syed tariq	Lower Site	HSE Training Hall Camp Office	17	Daewoo E&C and subcontractors.
18	Personal & health hygiene	18	2	2015	Doctor Bilal Ahmed	Lower Site	HSE Training Hall Camp Office	14	Daewoo Cooks
19	Work at height	22	2	2015	M. Javed	Lower Site	HSE Training Hall Camp Office	7	IVCC
20	Work at height	3	3	2015	M. Javed	Weir Site	HSE Training Hall Camp Office	49	Sungbo, Daewoo, K. D, IVCC
21	Thunder Lightening & weather safety training	6	3	2015	Raja Faisal	Lower Site	HSE Training Hall Camp Office	8	Daewoo E&C and subcontractors staff
22	Lifting Safety	5	3	2015	M. Javed	Weir Site	HSE Training Hall Camp Office	50	IVCC, Daewoo, Sungbo, K.D
23	Confined space entry	10	3	2015	M.Javed	Weir Site	HSE Training Hall Camp Office weir site	12	Korean staff
24	Safe Lifting and Rigging	12	3	2015	S. Tariq	Lower Site	HSE Training Hall Camp Office	19	Daewoo E&C and subcontractors staff

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25	Cleanliness of surrounding and garbage segregation	12	3	2015	Ammara Nazir	Lower Site	HSE Training Hall Camp Office	20	Daewoo E&C and subcontractors staff
26	HSE Counseling	16	3	2015	S. Tariq	Lower Site	HSE Training Hall Camp Office	1	M&E Daewoo E&C
27	Responsibilities of Construction Supervisor	19	3	2015	S. Tariq	Lower Site	HSE Training Hall Camp Office	6	Daewoo E&C and subcontractors.
28	Work at height	19	3	2015	Syed Zaeem Ahmed	Weir Site	HSE Training Hall Camp Office	16	Sungbo E&C
29	Lifting Operation training	20	3	2015	M. Javed	Weir site	HSE Training Hall Camp Office Weir site	6	Sungbo E&C
30	Safe Lifting and Rigging	25	3	2015	Sayed Tariq	Lower Site	HSE Training Hall Camp Office	20	Daewoo E&C and subcontractors staff
31	Lifting ,rigging & work at height	26	3	2015	M.Javed	Weir site	HSE Training Hall Camp Office Weir site	10 9	KY.DONG, Sungbo ,IVCC, Daewoo
32	Work at height	3	3	2015	M. Javed	Weir Site	HSE Training Hall Camp Office	49	Sungbo, Daewoo, K. D, IVCC
33	Thunder Lightening & weather safety training	6	3	2015	Raja Faisal	Lower Site	HSE Training Hall Camp Office	8	Daewoo E&C and subcontractors staff

# **Annex-6**

## **EMP COMPLIANCE STATUS**

Sr. No	Environmental Management Plan (Compliance Status)		
	Feature/Issue	Parameters/monitoring	Compliance Status/Action taken by EPCC
1.	Statutory Requirements	Compliance with approval conditions	<ul style="list-style-type: none"> <li>With few exceptions, implementation in compliance with EPA's NOC &amp; ADB's Environmental and Social Safeguards, IFC's Performance Standards</li> </ul>
2.	Landslides	Catchment stability	<ul style="list-style-type: none"> <li>Annual Monitoring undertaken after monsoon during September 2014 and report was shared with SHPL &amp; OE.</li> <li>Slope stability activities on both sites has been carried out during the month</li> </ul>
3.	Erosion and Sediment	i. Extent of erosion and sedimentation ii. Topsoil stripped and covered or seeded if stockpiled for longer than one month or during the monsoon	<ul style="list-style-type: none"> <li>Erosion &amp; Sediments on project sites has yet not been quantified, however, to prevent this protection works have been undertaken on slopes at both sites.</li> <li>Wind erosion of dust and sand has been controlled by frequent water sprinkling and covering stockpiles with polythene sheets</li> <li>To prevent HRT waste water sediments flow to the river settling tanks and chambers have already been constructed and being cleaned.</li> </ul>
4.	Muck Disposal	i. Reuse of spoil/muck within project areas where possible ii. Correct disposal of surplus spoil/muck in designated areas	<ul style="list-style-type: none"> <li>Excavated material being used in civil works and dumping is done on approved area at upper site. Muck material has also been used in repairing of project access road during the month</li> </ul>

5.	Water Quality	Wastewater treated prior to river discharge (Temperature, dissolved oxygen, pH, conductivity, turbidity, total phosphorous, inorganic phosphorous, total nitrogen, ammonia nitrogen, nitrogen oxides, biochemical oxygen demand and fecal coli forms)	<ul style="list-style-type: none"> <li>• Biannual water quality monitoring was undertaken during September 2014 and reports have been shared with SHPL &amp; OE. Next monitoring will be carried out during April 2015.</li> <li>• Waste water treated and monitored on both the sites.</li> <li>• Filter cartridges changed of the filter plants to provide adequate drinking water.</li> </ul>
6.	Waste Management	i. Waste materials reused or recycled on-site where possible  ii. Non-recyclable wastes disposed of appropriately	<p>Papers, mineral water bottles and tin cans are being sent to market for recycling</p> <p>Segregation, collection and disposal has been considerably improved on both the sites in the reporting quarter.</p>
7.	Hazards/Risk	i. Workers provided with appropriate safety equipment and regular safety training  ii. Storage of hazardous goods in bounded areas or in secure sheds  iii. Explosives stored in guarded bunkers  iv. Use of hazardous goods according to manufacturers' specifications	<ul style="list-style-type: none"> <li>• Induction trainings</li> <li>• Providing PPEs</li> <li>• Tool Box Meetings, Job craft &amp; on site trainings</li> <li>• Explosive store established under NOC (Lower Site)</li> <li>• MSDS and SOPs partially followed</li> <li>• Improper storage of chemicals at batching plants</li> </ul>
8.	Aquatic Ecology	i. Fish and Aquatic populations	<ul style="list-style-type: none"> <li>• Quarterly fish study undertaken during the reporting period.</li> <li>• Fishing&amp; hunting prohibited on project sites. No endanger species found. No considerable disturbance to aquatic life</li> </ul>
9.	Flora	i. Direct observation of surrounding vegetation	<ul style="list-style-type: none"> <li>• Study/monitoring undertaken during quarter. Removal undertaken as indicated in EIA. Mitigation measures will be undertaken after construction phase</li> </ul>

10.	Noise and Vibration	<ul style="list-style-type: none"><li>i. Maintenance of equipment in accordance with manufactures' specifications</li><li>ii. Controlled blasting</li></ul>	<ul style="list-style-type: none"><li>• Regular inspections and service of heavy equipment</li><li>• Regular monitoring, blast permit issued and SOPs adopted</li></ul>
11.	Air Quality	Exhaust emissions from machinery – visual inspection	<ul style="list-style-type: none"><li>• Regular inspections and service of heavy equipment</li></ul>
12.	Traffic/Access	<ul style="list-style-type: none"><li>i. Enforcement of speed limits on Project roads</li><li>ii. Noise Traffic Signs</li></ul>	<ul style="list-style-type: none"><li>• Heavy equipment/vehicle drivers education sessions</li><li>• Speed limit and directional sign board installed</li></ul>



# **Annex-7**

## **ENVIRONMENTAL INSPECTION**

### **CHECKLIST**

**Daily Environmental Monitoring Performa**













Date	Month	Time	Location	Inspected By	Reviewed By	Noted By
29-01-15	January	2:00 PM	Site Areas	Amara	Sir Aftab	Sir Chung

Potential Environmental Impacts	Yes	No	N/A	Comments
<b>Air Emissions</b>	✓			surge shaft due to compressor
a) Any sources of air emission?				
b) Are the emissions controlled and monitored?	✓			
c) Is indoor air quality monitored?	✓			
<b>Water Consumption &amp; Discharges</b>				
a) Any wastewater discharge?	✓			Sedimentation tanks at third corner
b) Is the quantity and quality of wastewater controlled and monitored?	✓			Removing & cleaning water having sludge.
c) Any process modifications to reduce water usage?	✓			
<b>Waste Management &amp; Housekeeping</b>				
a) Any waste generation?	✓			At surge shaft and powerhouse sheds.
b) Is the quantity of waste monitored?	✓			06 kg Plastic, 22 kg paper
c) Any waste separation practice?	✓			cardboard, toilet paper segregated
d) Housekeeping conducted at all points?	✓			
<b>Noise Impact</b>				
a) Any sources of noise emission?		✓		
b) Is the emission controlled and monitored?	✓			
c) Any process modification to reduce noise emission?	✓			PPE used properly
<b>Hazardous Waste Management</b>				
a) Any hazardous waste generation?		✓		
b) Is the quantity of hazardous waste monitored?	✓			GA/GC measured
c) Any process modification to reduce hazardous waste generation?			✓	

Please "✓" if there is environmental impact; "x" if there is no environmental impact; "?" if you are uncertain and further investigation is required.

**Log Sheet for water bowser operators for daily water sprinkling in project area.**

Date	Timings	Places	Operator name	HSE/ Signature
4/1-15	11:00 AM 3:30 PM	Sprinkling water on access Road from Thori Park to MND Workshop	Anayat	
5/1-15	11:00 3:00 PM	// // //	Zaman Anayat	
6/1-15	11:00 AM 13:00 PM	" " "	BASHIR ANAYAT	
7-1-15	10:00 AM 15:00 PM	" " "	LALA AFTAB LALA AFTAB	
08-01-15 08-01-15	12:00 AM 13:00 AM	" " "	LALA AFTAB HARON	
09-01-15	11: AM	" " "	MUNZOR	
10-01-15	10: AM	" " "	MUNZOR	
11-01-15	11:00	" " "	ZAMAN	
12-01-15	10:00	" " "	MUNZOR	
13-01-15	13:00	" " "	BASHIR	
14-01-15	13:00	// // //	Bashir	
15-01-15	13:00	Sprinkling water on access Road from Thori Park to Bridge	Anayat	

**Patrind Hydropower Project**

**2014**

**WEEKLY ENVIRONMENTAL COMPLIANCE CHECKLIST (NOVEMBER)**

Date Start	Date Finish	Time	Location	Inspected By	Reviewed By	Noted By
25-01-15	31-01-15	9:00	Project Site	Amara Nazir	Aftab Aalim	Chung Myung

EXPLAIN THOSE ITEMS IDENTIFIED ABOVE THAT WERE CHECKED, AND DESCRIBE THE CORRESPONDING

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

**CONTROLS TO BE IMPLEMENTED TO REDUCE POTENTIAL ENVIRONMENTAL IMPACTS:**

Trench has been prepared according to method statement by placing proper concrete of 20cm, 6 inches of clay and Geomembrane sheet. Waste segregation practice has been attempted at all main points to reduce reuse and recycle - no solid waste. Expired power and aggregate has found in the M&E Workshop so instructions given to procurement department to remove the hazardous waste as soon as possible.

Signature of Site Inspector

*Aftab Aalim*

Date

28/01/15.

Reviewed by HSE Manager

*Aftab*

Date

31/01/15.

Noted By Team Leader

*[Signature]*

Date

31/01/15.



<b>AKISTAN PATRIND HYDROPOWER PROJECT (PPHP)</b>				Document Number :	
<b>WASTE MANAGEMENT PLAN</b>				Revision : C2	Status : IFR
ent Type :	PNL	System / Subsystem :	N/A	Discipline:	HSE
				Rev. Date :	01 - Aug - 2011
				Page 18 of 18	

**DAEWOO E&C**

**WASTE CONSIGNMENT NOTE (HAZARDOUS / NON HAZARDOUS WASTE)**

**[ SECTION 1 ] \_ Generator Completes all of Section 1**

Generator Name:	Daewoo E&C	Generating Location:	Camp office
Address:	lower chatter	date:	25-01-14
Description of Waste:		Qty-Units	Type
Paper (پپر)			Non-Hazardous Waste (solid waste)
cardboards (کرتا)	22kg		
Bottles (بوتل)	10kg		
Iron bars (لوا)	25kg		
Plastic sheet (پلاستک شیٹ)			

GENERATOR'S CERTIFICATION: I hereby certify that the above named material has been properly described, classified and package and is in proper condition for transportation according to applicable regulations:

Generator Authorized Name: Jamil waste collector Signature: JAMIL Shipment Date: 26-01-14

**[Section 2] \_ Filled by Transporters / Waste Handler**

Name:	Mohammad Rauf
Address:	"lower chatter theory"
Title:	Daewoo Driver (HSE)
Phone No.:	030124080348
Truck No.:	3791
Acknowledgment of receipt of materials	
Waste Handler Signature:	Shipment Date: 26-01-14

**[Section 3] \_ Final Destination(Filled by Treatment Contractor)**

Site Name:	Scrap Yard	Phone No.:	0344-5569442
Physical Address:	lower chatter	Remarks:	Rs-2000/-
I hereby certify that the above named material has been accepted and to the best of my knowledge the foregoing is true and accurate			
Name of Designated Treatment Plant:	Mohsin Khan	Signature & Seal:	Receipt Date: 26-01-14

END OF DOCUMENT

"This document is the property of Daewoo E&C. It must not be produced or transmitted to others without written authorization from the any"

# **Annex-8**

## **FISH STUDY IN KUNHAR RIVER**



**147 MW Patrind Hydro power Project Pakistan**



**Quarterly Report**

**Study and Monitoring of Fish Fauna of Kunhar River**

**January-March 2015(March 24, 2015)**

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## **1. ABSTRACT**

This study deals with exploring the possible impact on the fish fauna of river Kunhar at and around Patrind Hydro Power Project area. The study is a continuous process with an interval of three months. This gives us the information of seasonal changes and changes of the same months in different years. This is the sixth study carried out during the month of March 2015.

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

## **2. INTRODUCTION**

The study has been carried out in six points of the river Kunhar starting at 34° 18' 18.56" N and 73° 26' 45.56" E to 34° 20' 40.54" N and 73° 25' 04.27" E covering about 10 km up and down the Weir at Patrind. The province of Khyber PakhtoonKhawa is located in the north-west of Pakistan and is largely located on the Iranian plateau and Eurasian land plate, while peripheral eastern regions are located near the Indian subcontinent and this has led to seismic activity in the past.

The province covers an area of 74,521 km<sup>2</sup> (28,773 sq mi). According to the 1998 census, the total population of Khyber Pakhtunkhwa was approximately 17 million out of whom 52% are males and 48% females. The density of population is 187 per km<sup>2</sup>.

The northern part of the province is snowy in winters, and also experiences heavy rain falls. Its valleys Swat, Kaghan, Chitral and Kohistan are surrounded by rugged mountains and have temperate climate, including cold winters. Upper reaches of rivers in these valleys carry clean cold water and are suitable for trout and schizothoracines (snow trout). Several

lakes and reservoirs also provide suitable conditions for coldwater fish. As one moves to south, transitional or semi-cold waters are present, with snow trout and mahseers fish species presence. Further south and at lower altitude warmwater fish species prevail.

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

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

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

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

### 3. FISH

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

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

Hora (1955) and Menon (1962) studied the evolution of schizothoracines and concluded that they appeared during the first interglacial period, when turbulent streams formed in Central Asia, necessitating the reduction of scales which is characteristic of schizothoracines. Primitive forms of this group occur today in South China. During the favourable environmental conditions of the second glacial period they migrated westwards as far as Kashmir and Sistan. The great proliferation of genera and species of the sub-family Schizothoracinae probably occurred during the second and subsequent interglacial periods. Today the schizothoracines are mainly Central Asiatic in distribution although a few species are present also along the southernface of the Himalayas.

The eastern Himalaya has a greater diversity of coldwater fish than the western Himalayan drainage. For the whole Himalayas, 218 species are listed (Menon, 1962). The subsistence and commercial fisheries exploit carps (*Labeo* and *Tor* spp.), lesser barils (*Barilius* spp.),

schizothoracines (*Schizothorax* and *Schizothoracichthys* spp.), garriids (*Garra* spp.) and sisorids (*Glyptothorax* and *Glyptosternum* spp.). The other genera are small-sized and of low economic value. The exotic brown trout (*Salmo trutta*) has established itself in some areas of the Himalayas.

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

Snow trout, a cold water riverine and short migratory fish is locally known as malli. It belongs to the family Cyprinidae and sub-family Schizothoracinae which are widely distributed in the Himalayan and sub-Himalayan region and much of the rest of Asia. Altogether 28 species of snow trout are reported in Himalayan river waters but only two of genus *Schizothorax* are recorded in the study area of river Kunhar. *Schizothorax curvifrons* and *Schizothorax plagiostomus* are high value sport fish and are common in river Kunhar. Both the species are phytophagous fish and has developed a special mouth to scrape the algae attached on stones. They spawn twice a year during September/October and March/April, but September/October is the best season for spawning. Clear water, stony bottom of creeks composed of fine pebbles and gravel, and water flow of 2.8-4 m/sec, pH 7.5 and dissolved oxygen concentrations of 8-15 mg/L form good spawning conditions in the natural environment.

The need for shelter from the current has led to territoriality. Mahseers and schizothoracines chase intruders to defend the limited food resource and available shelter. Such a behavior develops after the young fish emerges from the eggs laid in gravel. During winter months all size groups of mahseers and schizothoracines are present in pools when the water level is at its lowest and water is highly transparent. Such pools are present in the rivers Jhelum, Neelum, Kunhar and Swat. This is one of the devices employed by these species to confuse predators. When a few fish are caught in a cast net, the rest disperse.

To cope with the steep fall in temperature in winter months schizothoracines migrate from headwaters to lower altitudes where they represent a sizeable part in fish catches in large rivers and their tributaries. The rise in temperature in Kashmir and Kunhar streams from

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

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

The fluctuating discharge of water and drying out of streams, leaving only isolated pools or no water at all, is another important matter. A general observation during the last five studies on seasonal fluctuation in river discharge in Kunhar river system indicate that the range of mean flow from October to March (winter months) represents only 8-10% of the total annual flow. There are also variations from year to year depending on the winter and monsoon precipitation. Reduction of torrential streams to stagnant pools exposes the fish to terrestrial predators and to depletion in dissolved oxygen concentrations, especially when autumn leaf fall takes place. However, due to low temperature, the level of dissolved oxygen may not fall below the optimum required by coldwater fish (7.0-8.0 mg l). As soon as the flow is restored with spring rains and snow-melt water a rapid recolonisation of the stream takes place.

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



As a result of this study in river Kunhar it came out that a gradual increase in water temperature and pH corresponds to a decrease in dissolved oxygen, decline in the density of nymphs of mayflies and stoneflies, but in an increase in larval and adult aquatic beetles. The information collected during expeditions is based on spot measurements and it does not represent average values. The following parameter ranges for the Kunhar river were recorded at six sampling points during March 2015. Following table shows the result; transparency; pH; water temperature (°C); dissolved oxygen;

**Table-1 showing water parameters**

S No	Point	Dissolved Oxygen (ppm)	pH	Temperature °C	Transparency
1	Boi	9	6.5	12	0.8
2	Nallah Boi	8	7	18	0.7
3	Parri	10	6	12	0.9
4	Tunnel exit	No data could be collected due to inaccessibility			
5	Tunnel Inlet	12	6.5	12.5	1
6	Tarchella/Shorran	13	6.5	12.5	1.1

#### **4. Fish catch and fishery potential**

The fishing activities take place for 8 months of the year during spring, summer, autumn and the early winter months (interview with locals and fishermen). There is usually no fishing during floods and part of the winter season. The full-time fishermen fish for 6 months and catch 0.2-1.2 kg per day. The individual catch is around 126 kg per person per year. The 6 professional part-time fishermen generally fished 2-5 months per year and were laborers, mechanics, a few businessmen and a few job holders. The fish catches ranged between 0.2 and 0.5 kg per person with an average catch of 43.5 kg per person per year. However, the electro fishing fishermen caught fish in the range of 2-4 kg, with an average of 315 kg per fisherman per year, and they fished in groups of 3-5 people. Basically, occasional fishermen were non-fisher groups and fished for recreation. Such groups fished

2-10 times per year and caught 0.2-0.5 kg per day, with an average of 2.1 kg per person per year for consumption.

The fishermen fish in the main Kunhar river system and its tributaries. The estimated total length of the river with its tributaries is 214 km other than the trout area with an average water depth of 2.2 m.

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

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

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

Use of explosives and electro fishing gear in river Kunhar is usually done by the non-professional fishermen who visit the areas in groups. They damage the point very badly and stay at the site for one to two hours, catch the easy accessible fish and leave the other dead fish to flow away with fast current of water.

## 4.1 Fish catches and species composition

Two professional fishermen were engaged for fishing in the river Kunhar at fixed sampling points. Fishing in the Kunhar River using cast nets of 1 m to 1.5 m diameter recorded a catch of two fish species only. The catch comprised mainly of *Schizothorax plagiostomus* (75%) followed by *Schizothorax curvifrons* (25%). The water is muddy and fish catch was very low at all points unlike the last year during the same month (March 2014).



1. Fisherman Mr. Mohammad Haneef



2. Fisherman Mr. Abdul Manhan

## 4.2 Other Fish species of River Kunhar reported in the past:

### 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*

*Tor tor*

*Labeo spp*

*Cyprinus carpio*

### Family: Sisoridae

*Glyptothorax kashmirensis*

## **5. Sport and recreational fishery**

### ***Trout***

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

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

## **6. Fisheries Status of River Kunhar in view of locals**

During the study few locals were also interviewed who are having some water mills (Gharat) just beside the river or nallahs. Among them were Mr. Khaqan Hussain Shah, Mr. Husnain Gilani and Mr. Mohammad Sadiq. According to them a gradual decline in the fish catches have been observed during the last two decades. Use of explosives and poisoning are the major two reasons and electro fishing has also been observed for the last two years in River Kunhar and Nallah Boi. The people responsible for doing so are mostly non-resident visitors not the locals. Most of the small size fish so killed flows down in river Kunhar. Another reason of decline in the fish population, according to them, is the predation of local fish by exotic trout fish in the upper reaches of the Kunhar.



3. Interview with locals

## 7. Field Results:

### 7.1 Point-I (Boi)

First sampling point off the study is situated at  $34^{\circ} 18' 19''$  N,  $73^{\circ} 26' 44''$  E at 2422 ft of elevation above sea level. The water level is moderate and it is turbid due to rains for the last two days. Two fish could be caught in the cast net. Both the fish caught were *Schizothorax plagiostomus* with a length of 7.5" weight 57 grams and length 8.4" and weight 89 grams respectively.



4. Sampling at point-I





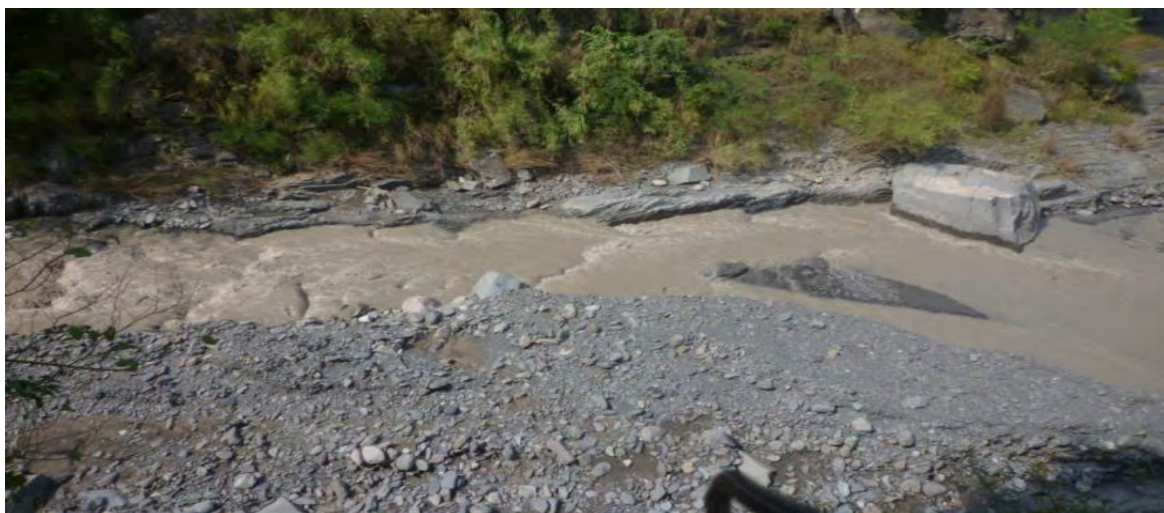
5. Weighing the fish

## 7.2 Point-II (Domel Boi)

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



6. Sampling at Point of confluence of nallah Boi with River Kunhar



*7. Turbid water of Nallah Boi during last study*

### **7.3 Point-III: (Parri)**

This sampling point is situated at  $34^{\circ} 19' 47''$  N,  $73^{\circ} 25' 35''$  E at 2475 ft of elevation above sea level. The river is turbid at this time of the year due to rain. The small creek joining the river is also muddy. Chance of fish catch was expected to be very low and proved correct. No fish could be caught here. Water temperature was  $12^{\circ}$  C and pH 6.5.



*8. Sampling at point-III, Parri*



### **8.1 Point IV: (Outlet of river diversion)**

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



*9. Sampling Point at outlet now*



*10. Outlet of Diversion Channel at Patrind during last sampling*

## 10.1 Point-V: Diversion Tunnel Inlet

This is the point situated at  $34^{\circ} 20'36''$  N,  $73^{\circ} 25'08''$  E, at 2615 ft of elevation above sea level. This is the inlet of the diversion tunnel. Last time the inlet point was not accessible because of the increase in the water flow and blockage of the possible path leading to the point. No fish could be caught here. Still the impact on aquatic life is not very high as the lake has not developed and course and flow of water has not changed here. When the lake will grow after construction of Patrind weir, this can harbour the Rainbow and Brown trout. If carefully planned, this can become commercial activity but needs expert inputs.



11. Sampling at inlet of water diversion tunnel

## 10.2 Point-VI Dumping Point

This is the point situated at  $34^{\circ} 18' 19''$  N,  $73^{\circ} 26' 44''$  E at 776 meters of elevation above sea level. This is the dumping site of the disposal from the tunnel. This a potential site of the lake emerging due to damming on the river at Patrind. Two fish could be caught here one *Scizithorax plagiostomus* and the other *Scizithorax curvifrons*. The size of the fish *Scizithorax curvifrons* was 5.8'' with a weight of 34 grams and the other *Scizithorax plagiostomus* was 7.5'' with a weight of 97 grams.



12. Sampling at point VI

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

Point 1				
S no.	Name of Species	Weight gm	Length inch	Remarks
1	<i>Schizothorax</i>	57	9	
	<i>plagiostomus</i>			
2	--do--	89	8.4	
Point 2				
				No fish could be caught
Point 3				
				No fish could be caught
Point 4				
				No fish could be caught
Point 5				



				No fish could be caught
<b>Point 6.</b>				
<b>1</b>	<i>Schizothorax plagiosomus</i>	97	7.5	No fish could be caught
<b>2</b>	<i>Schizothorax curvifrons</i>	34	5.8	
<b>Total Fish caught</b>				
	<i>Schizothorax plagiosomus</i>		3	
	<i>Schizothorax curvifrons</i>		1	

Species composition

*Schizothorax curvifrons* 1

*Schizothorax plagiosomus* 3

## 11.MANAGEMENT AND CONSERVATION

Conservation and river system management has remained a very big issue all over Pakistan. Over the years uncontrolled and often indiscriminate fishing in the largely unmanaged river and streams has resulted in a sharp decline in catches of the important sport and subsistence fish. The increasing use of river water for irrigation, hydropower production, municipal and industrial purposes, and the inputs of pollutants has a very negative impacted on fish stocks. Among the difficulties that fishery managers are facing today is the shortage of data for a number of rivers and even whole areas of Himalayas. The most essential requirement is to estimate the resources which would enable the fishery scientists and planners to formulate a management policy. Another and an increasingly important aspects, is the need to evaluate the environmental impacts caused by human-induced changes in river and lake catchments, and how these have contributed to the decline in fish stocks. The use of destructive methods of fishing calls for effective enforcement of legislative measures and for education of the fishing community. There is a need to improve the surveillance along the rivers in order to

protect fish stocks. In this respect the role of voluntary agencies in conserving stocks must not be underestimated.

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

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

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

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

## 12.Comparison

There is no apparent difference in the results of these six studies which shows that the impact has not significantly appeared on the aquatic environment of the River Kunhar. Insignificant changes in the fish catch and quality of water observed during the study is only due to the irregular seasonal changes and pattern of water turbidity due intensity of rain or drought. This is mainly because of the ecology of the river has not changed very much except at the outlet of the diversion at Patrind. The major change in ecology is expected after the weir construction and obstruction on the river flow. This will affect the migration of the fish even upstream and all breeding grounds will highly be affected downstream. The species composition may change and some species may disappear with the change of river ecology.

**Table-3 Comparative number of fish Caught at sampling points**

Period	Point	No. of fish	Period	Point	No. of fish
July-September 2013	1	3	July-September 2014		
	2	6		1	0
	3	4		2	4
	4	0		3	1
	5	1		4	2
	6	0		5	3
				6	2
October-December 2013			October-December 2014		
				1	6
				2	5
				3	0
				4	4
				5	0
				6	3

January-March 2014	1		January-March 2015	1	2
	2			2	0
	3			3	0
	4			4	0
	5			5	0
	6			6	2
April-June 2014					
	1	5			
	2	7			
	3	4			
	4	0			
	5	No access			
	6	2			

### 13.Recommendations

Fish catches in the Kunhar River have been declining because of the use of illegal fishing methods such as poisoning and use of electro-fishing gears. To preserve the fish stocks, controls should be imposed on illegal fishing practices and a fish sanctuary established. The deep water pools of the Kunhar and its feeder streams should be declared fish sanctuaries for the protection of spawners.

The Kunhar River catchment has been subject to deforestation, resulting in erosion and silting of streams and rivers. There is a need for land rehabilitation measures to be urgently implemented in the watershed. The incidence of water pollution is increasing in the lower reaches of the river due to the discharges of sewage waste, and the illegal use of insecticides, pesticides and pesticides. Control over such activities must be strictly enforced.



Habitat improvement is an essential factor for fishery improvement. To avoid seasonal changes of water level, suitable pools should be created under the management of the local development authority. Such a practice will improve the fish habitat quality and avoid the winter desiccation.

Protection of fish stocks and fishery regulation should be based on periodic assessments of fish stocks. It is high time to enforce the existing fishery law and to restrict the use of nets with less than 2 cm mesh size.

Early planning and consultation with expert should be initiated to have aquaculture development in the cold water pool appearing as a result of damming on river Kunhar at Patrind.

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# **Annex-9**

## **VEGETATION STUDY- PATRIND HPP**

**147 MW Patrind Hydro Power Project Pakistan**



**Quarterly Report**

**Study the impact of the project on the vegetative cover**

**January-March 2015 (March 24, 2015)**

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## **VEGETATION STUDY OF PATRIND HYDRO POWER PROJECT**

### **1. Abstract**

Dams and reservoirs are built for many reasons like, flood control, energy production, and improvement of navigation, irrigation, provision of water for domestic and industrial use. Construction of a dam and creation of reservoirs have very significant effects in that a land and river environment actually transformed into a new environment with lacustrine conditions. In these new conditions, some important impacts such as socio-economic impact, geological impact, ecological impact and water quality and climate are very significant. The degree of these impacts depends on the local conditions. Sometimes socio-economic impact dominates the environmental and geological impact and vice versa.

The project of Patrind Hydro Power Generation has started with socio-economic issues and still they are in place. Geological and environmental issues are coming up with the progress of the work. The area is prone to landslides, deforestation in the working zone and change of course of water.

### **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 2516-3123 ft a.m.s.l) and around the outlet at Alda (34° 20' 06.05" N, 73° 27' 18.6" E) in AJK. It covers both the eastern aspects on the left bank of river Kunhar and right bank of river Jhelum in AJK. Total Area is about 100 Acres.

The environmental impacts by dams and reservoirs have been recognized widely in the first stage modern dam construction period that was after the Second World War. In this period, large scale dams had been constructed especially in the North and the South America, Canada and Europe zone. And at the same age, the dam developing activities were promoted in Africa and Asia zones due to financial supports.

The United Nation Organization (UNO), the World Bank, International Commission on Large Dams (ICOLD) and other donor organizations have raised their concern on the impacts of damming on the natural flowing waters. All these wanted to relate such development activities to the upcoming issues and impacts and properly address these issues to a level of maximum satisfaction.



### 3. Study Area

This study covers the intake and outlet areas of the project covering the surrounding area that can be affected due to the implementation of this project.

### 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.

### 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 felled down. The rest of the vegetation species were found protected and common in Pakistan and for the rest of the world. So it is concluded that there will be no negative impacts of Patrind Hydropower Project on conservation status of the plant species composition of the area.

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

<u>Common Name</u>	<u>Botanical Name</u>	<u>Type of Tree</u>	<u>Status</u>
Akhrot (Wallnut)	<i>Juglans regia</i>	Fruit	common
Anjeer	<i>Ficus carica</i>	Fruit	rare
Batang	<i>Pyrus patia</i>	Fruit	common
Batculd	<i>Celtis australis</i>	soil binder	rare
Beence	<i>salix spp</i>	Firewood	common
Ber	<i>Zizyphus mauritiana</i>	Fruit	common
Chir	<i>Pinus roxburglii</i>	Timber	common

Dhaman	<i>Grewia oppositifolia</i>	Fodder	common
Drawa	<i>Ailanthus anus</i>	Firewood	common
Drek	<i>Melia azadrach</i>	Firewood	common
Kangarr	<i>Pistacia khunjak</i>	Soil binder	rare
Kau	<i>Olea cuspidate</i>	Agri tools,	common
Kiker	<i>Acacia nilotica</i>	Firewood	common
Nim	<i>Azadirachata indica</i>	Firewood	common
Phagwarr	<i>Ficus Palmata</i>	Soil binder	common
phulai	<i>Acacia modesta</i>	Firewood	common
Pipal	<i>Ficus religiosa</i>	Firewood	common
Robinia	<i>Robinia pseudoacacia</i>	firewood	common
Shahtoot	<i>Morus alba</i>	Fruit	common
Sherol	<i>Alnus nitida</i>	Firewood	common
Snatha	<i>Dodonaea viscosa</i>	Soil binder	common
Talli (shisham)	<i>Dalbergia sisso</i>	Furniture wood	common

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

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

## **6. Comparison of the studies**

The area has been very badly affected by the landslide on both the sides. Short creating was done in the intake area above the right bank of the river Kunhar at the site of dam construction. The concrete work has again been started with the reinforcement of iron bars. The picture below shows the condition of the area. It also shows the bad look of the site as if it is a desert.

No plantation and bio-engineering work have been undertaken on the site for controlling the erosion and giving it a good looking shape.



*Picture: Showing landslide and new short creating at Patrind*



Other left side above the river Kunhar is also not very much different than the right bank as seen in the photograph below. The site outside the project area also shows the need of plantation which has not been done so far in spite of strong recommendations under the previous studies.



The site at Alda even shows the worst position. The slide area inside and outside the project site has been damaged very badly. New land slide at the point of outlet has appeared resulting in the change of outlet position. The slide has covered more area at the upper side. Pictures of the previous and current study are given below for comparison purposes.



*Picture: Showing position of landslide during December 2014*





*Picture: showing the present position of the site*



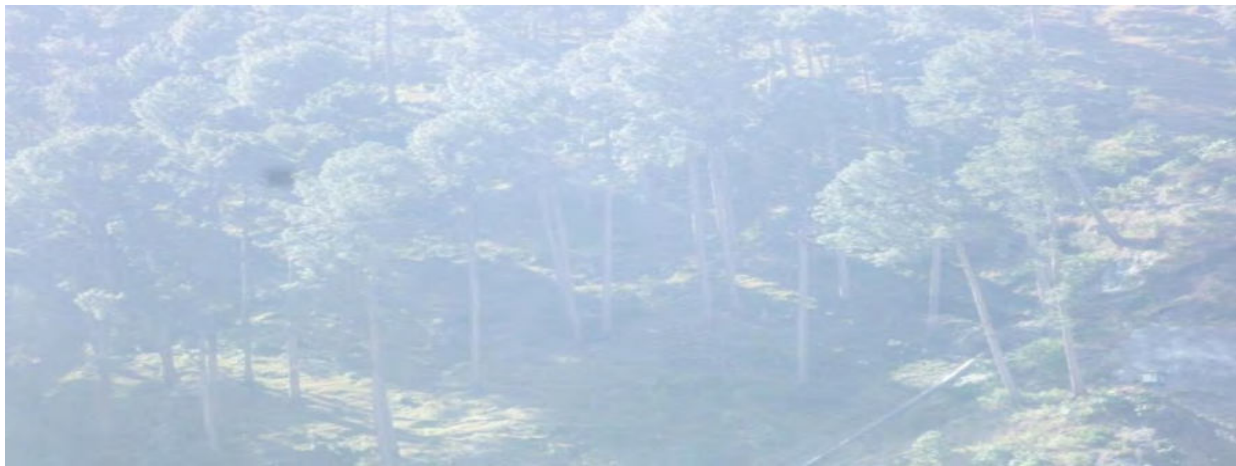
## **7. OUTCOME OF THIS STUDY**

There has been observed a great change from the last study. Both the areas, at Alladra and at Patrind have been affected by the landslides and is showing a desert like look of the area. Had it been treated with bio-engineering works it would have not only stabilized the slides but it would have given a lush green picture of the area like the picture given below.



Engineering structures alone cannot control the slides and again this will require a huge amount of funds for engineering structures. Treating with short creating instead of treating it with plantation and bio engineering will not be a permanent solution to it. The project is mostly looked after by the Engineers and to them, short creating 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.

Many Chirpine trees outside the project area are leaning on one side and they are susceptible to fall down by a strong wind at any time. No new sapling plants are coming up and area has been left to the mercy of nature. One fallen tree can be seen in this picture below:



*Picture: Showing a fallen tree and some leaning trees at Alda*

Some more trees have been harvested on the inlet and outlet of the tunnel where land has also been affected to some extent which needs a careful treatment.

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* (Butculd) 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 felled down. The rest of the vegetation species were found protected and common in Pakistan and for the rest of the world. So it is concluded that there will be no negative impacts of Patrind Hydropower Project on conservation status of the vegetation of the area except to a limited extent for which suggestions have been given below.

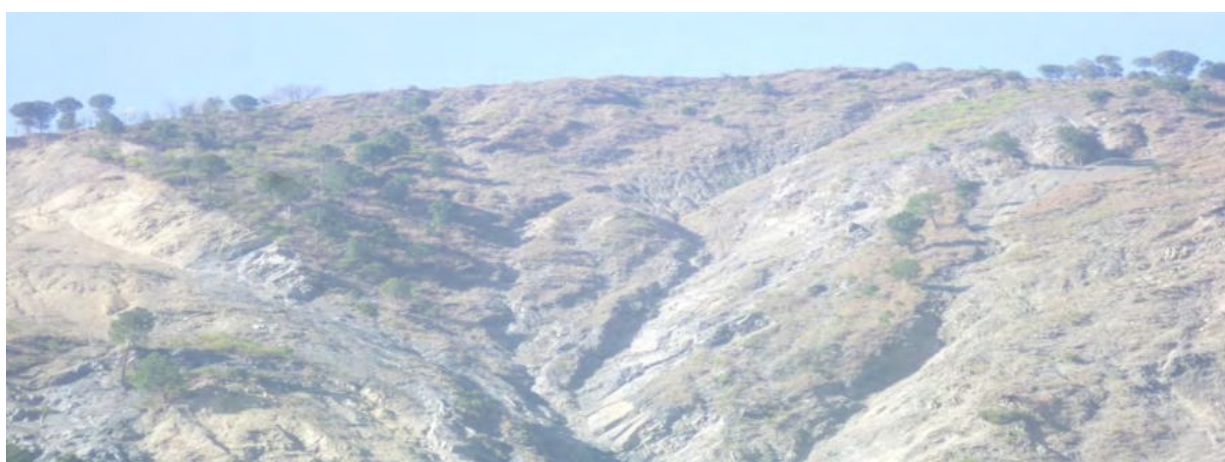


The present status of vegetation on Patrind side does not depend upon the water of river Kunhar but it depends on natural precipitation or water channels taken out of the side nallahs. So reduction in water regime downstream will not affect the vegetation of the area. The average biomass for forage that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

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

### **8. Possible Impact of the Project**

The result indicate that landscape, the nature of the rock and the redistribution of rainfall water by run-off are the main sources of spatial variation in the study area. The construction of the dams will positively affect the groundwater at the upstream and negatively at the downstream of Patrind. Downstream the vegetation composition along the banks will make a huge difference as some area which is under river water will have no more water and some invasive species may appear on the tract. Water retention capacity of the soil above the tunnel will reduce as the percolation rate will increase and drain out from the tunnel. This will definitely have a negative impact on the water loving plant species and species of low water requirement will dominate changing the ecology of small area. Ground water will be affected downstream of the Patrind, but the dependence on that water is not existing; **so no social impact is expected. Landslides acceleration is the major issue which has been observed during the implementation of the project and needs special attention.**



## **9. Recommendations**

The slides inside and adjacent to the project site have spread definitely due to the blasting effect of the project. The intense level of vibration has accelerated the erosion rate in the area which needs special attention.

Since the area close to the tunnel and inlet and outlet of the tunnel where working concentration is high, the impact on the vegetation and water courses will have negative impact. The lake will submerge some of the vegetation due to rise in water level. Similarly downstream the water area will reduce so new species may appear along the banks of the river course. There is a need to compensate this loss by some possible means listed below:

1. Tree species of alternate requirement of water and soil should be planted in these area like shrole, salix be replaced by robinia, walnut

2.. Areas of high working concentration (in-let and outlet of the tunnel) are facing the problem of soil erosion and these have been treated by concreting. It was suggested in the first 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 sodding, sowing with geo- textile sheets, brush wattles, brush layering, hedge layering, semi-dead fences with live hedges. Total engineering treatment has caused a loss for growing vegetative cover. This will also contribute in the process of global warming and environmental degradation which is not acceptable globally. This adverse effect should be compensated by treating the adjacent slides with Bio-engineering measures which will not only treat the soil but will also improve the environmental status.

4. Forest fires are likely to occur during the month of June. Attention should be paid for that as recommended last time.

Note: The area should be treated with biological means along with engineering works, the otherwise position will further deteriorate. It is very important to start working in the light of this report.

# **Annex-10**

## **IMPLEMENTATION PLAN OF SOCIAL UPLIFT PLAN**

## Implementation Status & Plan of Social Uplift Plan

SR.	PROPOSED ACTIVITY	STATUS
1.	BRIDGE ACROSS JHELUM RIVER	✓ 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
3.	IMPROVEMENT OF EXISTING ROAD	✓ The road from Supreme Court to Children Park will be improved and upgraded where possible.
4.	CONSTRUCTION OF NEW ROAD	<ul style="list-style-type: none"><li>✓ New road will be constructed beyond the Children Park located in Lower chatter to the location of the Access Bridge for Powerhouse. The road will be available for physical use by the locals.</li><li>✓ At present unpaved has been constructed for construction activities which will be improved after construction phase</li><li>✓ Project access road has recently been reconstructed by Muzaffarabad City Development project</li></ul>
5.	IMPROVEMENT OF THE SITES	✓ After construction phase
6.	MEDICAL TREATMENT FOR LOCAL RESIDENTS	<ul style="list-style-type: none"><li>✓ HSE Clinic and ambulances are available in case of any emergency on both sites</li><li>✓ A doctor and male nurses are placed in HSE office and local people can visit to get emergency treatment.</li></ul>

SR.	PROPOSED ACTIVITY	STATUS
7.	LOCAL EMPLOYMENT	✓ Unskilled jobs have been provided to local residents whereas preference has been given to locals for technical positions but subject to availability.
8.	SCHOOL SUPPORT	✓ School located at Sarati village (Deedal) has partially been completed by EPCC
9.	IMPROVEMENT OF WATER SUPPLY	✓ Water pipe line had been developed from existing water tank to Sarati village (GI Pipe : D50mm, L230m) ✓ The well has been developed at Batching Plant area during construction period and it will be transferred to local residents. ✓ Another well near camp office lower site is developed and is operational.
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.
11.	EMBANKNET PROTECTION	✓ From the Access Bridge area along the riverside, slope protection and embankment has been reconstructed for avoidance erosion of river bank and inundation of Lower Chatter during flood season.