

**Minutes of the 67<sup>th</sup> Meeting of the Expert Appraisal Committee for River Valley and Hydroelectric Projects constituted under the provisions of EIA Notification 2006, held on 6<sup>th</sup> June, 2013 at SCOPE Complex, New Delhi.**

The 67<sup>th</sup> Meeting of the Expert Appraisal Committee (EAC) for River Valley and Hydropower Projects was held during 6<sup>th</sup> June, 2013 at SCOPE Convention Centre, Opposite Jawaharlal Nehru Stadium, New Delhi. The meeting was chaired by Dr. B. P. Das, Vice-Chairman. Sh. Shri Rakesh Nath, Chairman, Dr. J.K. Sharma, Dr. S. K. Mishra, Dr. S. Bhowmik, Dr. Praveen Mathur, Members, EAC could not attend the meeting due to pre-occupation. The list of EAC Members and officials associated with various projects who attended the meeting is annexed.

The following Agenda items were taken-up in that order for discussions:-

**6.6.2013**

**1. Agenda Item No.1: Welcome by Chairman.**

The Chairman welcomed the members and the following agenda items were taken up for discussion. The Minutes of the 66<sup>th</sup> EAC meeting were confirmed with the following amendments:

**Agenda item No. 2.4 Panan HEP (300 MW) in North Sikkim District of Sikkim by Himagiri Hydro Energy Pvt. Ltd. – For Consideration of Environment Clearance for revised capacity from 280 MW to 300 MW.**

- River Talong should be read as Tolung.
- The portion “to be submitted” preceding the last line/para of that item to be deleted.

**Agenda item No.2.9 Pemashelpu 90 MW Hydro Electric Project on River Yargyap Chhu in West Siang District of Arunachal Pradesh by M/s. Mechuka Hydro Power Pvt Ltd- Extension of Validity of ToR and Intimation for change of barrage location etc.**

The data/figures shown under column 3 & 4 have to be reversed as reproduced below:

<b>S. No.</b>	<b>Item</b>	<b>Original</b>	<b>Revised</b>
1.	Catchment Area (Km <sup>2</sup> )	368	366
2.	F.R.L (m)	EI.2220	EI.2236
3.	Area under submergence at FRL (Ha)	2.5	2.87

4.	Gross storage at FRL (MCM)	0.248	0.256
5.	Live storage (MCM)	0.200	0.202
6.	Net Head (m)	245.67	264.30
7.	Design Discharge (Cumecs)	40.37	37.73
8.	Installed Capacity (MW)	90	90
9.	Land Requirement (Ha)	63	55.25

- **List of Participants** - In the list of participants the member Dr. S. K. Mazumdar to be added

### **Projects considered on 06.06.2013**

#### **2.1 Panan HEP (300 MW) in North Sikkim District of Sikkim by Himagiri Hydro Energy Pvt Ltd:For consideration of Environment Clearance for revised capacity from 280 MW to 300 MW.**

Panan HEP Project is envisaged on Tolung Chhu, a tributary of Teesta River in Sikkim. This project was formulated as 300 MW project and EIA/EMP documents were prepared for 300 MW project (4x75 MW) following the site clearance issued by the Ministry in 2005 for 300 MW installed capacity. However, MoEF accorded environment clearance in January 2007 for an installed capacity of 280 MW, as the draft DPR available at the time of environment clearance was of 280 MW only.

The matter of awarding EC for an enhanced capacity of 300 MW was earlier considered in 66<sup>th</sup> EAC meeting held on 3<sup>rd</sup> - 4<sup>th</sup> May, 2013. The project developer submitted the following documents to substantiate that the project was formulated as 300 MW scheme:

- MOU with Govt. of Sikkim signed on December 05, 2005 for 300 MW
- Site clearance accorded by MoEF on October 06, 2005 for 300 MW
- EIA and EMP reports prepared by CISMHE for 300 MW
- Public hearing was conducted on September 18, 2006 for 300 MW
- Final EIA and EMP reports submitted to MoEF for EC was of 300 MW

- vi. Stage I Forest Clearance accorded by MoEF on December 19, 2008 for 300 MW
- vii. Stage II Forest Clearance accorded by MoEF on September 21, 2010 for 300 MW.

Following the issuance of EC in 2007, the developer obtained the approval of CWC to the flow series (hydrological years 1990-2004) vide CWC UO number 4/514/2006-Hyd(NE) dated September 04, 2009, on the basis of which the design discharge was fixed at 97.86 m<sup>3</sup>/sec. Based on the approved hydrological series, the developer approached the CEA for TEC, which was accorded for 300 MW scheme on March 07, 2011.

The matter was discussed at length in 66<sup>th</sup>EAC meeting and the Committee agreed 'in principle' to an installed capacity of 300 MW after reviewing in detail the project parameters of the 300 MW scheme vis-à-vis the 280 MW scheme for which the EC was accorded in 2007. The committee noted that there is no change in project location and features which might lead to higher environmental impacts. The Committee also reviewed the flow availability in the river, design abstraction and environmental releases/spills in different seasons. In the 66<sup>th</sup> meeting, EAC, however, noted the following and asked the developer/consultant to provide detailed responses with documents:

- (a) Mangan Earthquake of magnitude 6.9 m (18 Sept 2011) has caused severe damage around local area with a high seismic intensity. Therefore it is necessary to revisit the seismic parameters with aftershocks of Mangan earthquake data.
- (b) The design abstraction of 97.86 m<sup>3</sup>/sec allows for adequate environmental release to the river in the monsoon, pre-monsoon and lean season. As almost eight years observed hydrology data is available after approval of the EC, the response of the basin can be better judged in the context of drawl of 97.86 m<sup>3</sup>/sec. This needs to be explained in detail and CWC data submitted for EAC to review.
- (c) Dam Break modeling for the CWC approved PMF may be submitted.

- (d) The Environment Management Plan (EMP) may be suitably revised and cost of implementation of each component of EMP has to be examined to the realistic level in the present day norm. A few observations were also made to the methodology adopted in preparing the EIA.

The developer submitted replies to all the observations of the Committee and the matter was discussed during 67<sup>th</sup> EAC meeting at length to cover all the above observations as under:

- a) It was informed that after the earthquake of September 16, 2011, vide letter No. 2/2/2011(Vol-II)/FE&SA/710 dated 21 December, 2011, site specific earthquake seismic design parameters for Panan HEP, as recommended by IIT Roorkee, were considered and approved by the National Committee on Seismic Design Parameters (NCSDP) and the same were accepted by the Central Water Commission. It was informed by the developer that the civil designs for the project are being prepared as per the norms approved by the NCSDP. Developer also submitted produced a copy of the letter conveying the approval.
- b) Flow data and release towards environmental flow issues were discussed in detail in the 66<sup>th</sup> EAC meeting. These were further reviewed so that environment flow release/spills would be adequate. It was noted that CWC has approved the hydrological series in 2009. This is a 14 years series from 1990-91 to 2003-04 with 1999-2000 as 90% dependable year. For the lean season flow, during the environment clearance issued in January 2007, no specific stipulation was made, however, DPR has kept a provision of 10% of the average flow in 3 lean months of 90% dependable year which works out to be 1.29 cumec. As per the present norms, 20% of average flow in four leanest months of 90% dependable year is to be taken as minimum environment flow for lean season. This works out to be 2.74 cumec and the committee recommended enhancing the environment flow quantum from 1.29 cumec to 2.74 cumec for lean season. The Consultants have also presented the results of simulation modeling under different flow release scenarios in lean season. Modeling was carried out on Mike 11 and flow release scenarios were

simulated for 1.29 (DPR provision), 2, 2.5 and 2.74 cumec (20% of four leanest months in 90% dependable year) Based on the depth velocity analysis, 2 cumec of environment release appeared to be adequate for initial 2 Km stretch, which is critical and thereafter tributaries start contributing to the flow. However, committee recommended a provision of 2.74 cumec as environment flow during lean season.

As far as the flows in monsoon and other months are concerned, a detailed presentation was made about the water availability in the river based on CWC approved series (1990-91 to 2003-04) and daily discharge data obtained from CWC for the year 2004-05 to 2011-12. This 8 years data corresponds to CWC G&D site located on Tolung Chhu at Sankalang (CA: 777 Km<sup>2</sup>) and transferred to project site (CA: 592 Km<sup>2</sup>). Additional daily discharge monitoring is carried out at G&D Site established by project proponent at dam site; three years daily discharge data is available at this site (2009-10, 2010-11 and 2011-12) which is found to be consistent with the CWC data transferred to the diversion site. Observed data and additional 8 years daily discharge data show that sufficient monsoon spills are available in all the years for the entire monsoon period. Many of the flood peaks were in the range of 300-400 cumec band and some were as high as 500 cumec. Committee noted that all these flood peaks will be available in the river during monsoon period and this along with contribution of intermediate catchment will ensure that river will never run dry.

From the historical data, the Consultants presented the daily discharge hydrograph in the monsoon for the hypothetical 90% year (1999-2000) which revealed seven spikes (flood pulses) rising to 200 cumec over a period of 70 days. The hydrograph also revealed that the spills in excess of design drawl of 97.86 cumec would be occurring for over 27 days out of 70 days. The integrated volume was assessed as 17% of the flow. In other years the peaks were up to 500 cumec and integrated volume much above 30%. The actual flow figure from the 2004-05 to 2011-12 show the leanest year as 2009-10. Examination of daily flow reveals the spill in this year as 23% in monsoon whereas the spills in other years ranged from 35-55%. The highest spill of 55% was recorded in 2007-08.

The Committee further took into consideration that as the project got environmental clearance in 2007, environment flow provisions were neither stipulated nor made at the time of clearance. The committee considered a depth of 0.8 m during monsoon as sufficient for fish fauna, which will be available with a flow of 8 cumec. The Consultant explained that with 6 cumec minimum release below dam in monsoon and 2 cumec from streams contributing from intermediate catchment immediately downstream, 8 cumec flow will be available. Daily discharge data of 8 years from CWC and 3 years observed data show much higher spills adequately justifying design abstraction while meeting the present day environment norms. The Committee also reviewed the simulation modeling carried out by consultant for flow release scenarios beyond 2.74 cumec i.e. for flow release of 3, 4, 5 and 6 cumec with a view to fix minimum environment flow requirement in monsoon and other months which will ensure that in case of a very dry year river stretch between dam and power house should not run completely dry. In the monsoon season, the flood peaks of 150-200 cumec as is observed in daily discharge data of 90% dependable year will be extremely beneficial to aquatic fauna and for supporting phytoplankton, zooplanktons and macro-invertebrates. In other years, as discussed above, spills are much higher and adequately meet monsoon flow requirement. The Committee expressed satisfaction with the explanations and calculations made on environmental flow but recommended that 8 cumec minimum release instead of 6 cumec as environmental flow during monsoon months (June-September) and 2.74cumec release as environmental flow during remaining months. During non lean & non-monsoon season, a release of 3.5 cumec shall be made. The 6 cumec minimum release will actually occur for 10-15 days in the monsoon, in between spells of high release of 50 to 100 cumec over 40-50 days. Such a pattern mimics the wet (spikes) and dry spell in a river that normally experienced as flow regime conducive to Ichthyio-fauna.

- c) Dam Break Modeling for the revised PMF has been prepared and copy has already been submitted to the MoEF and to all the EAC members.
- d) The total provision in the original EMP was for a sum of Rs 1720.44 lakhs and taking into consideration the inflation over the past 7 years, most of the EMP provisions are

now proposed to be increased substantially. It was intimated that the budget for Fisheries development has been increased from Rs. 31.69 lakh to Rs. 87.17 lakh; for public health delivery system from Rs 80.30 lakh to Rs 117.80 lakh: Budget for Solid Waste Management is increased from Rs 32.70 lakh to 45.30 lakh and the Budget for LPG subsidy of Rs 25 lakh to Rs 42.50 lakh. It was also informed that the provision for Muck Dumping has been substantially increased from Rs 133.14 lakh to Rs 806.80 lakh and lump sum provision for landscaping and restoration of construction areas has been increased from Rs 39.00 lakh to Rs 82.00 lakh. Further the original provision for green belt around the reservoir is increased from Rs 5.90 lakhto Rs 10.06 lakh; Disaster Management from Rs 183 lakh to Rs 265 lakh and Environment Monitoring from Rs 40 lakh to Rs 70 lakh. In case of R & R, cultural development and social development, the original provision of Rs 112.40 lakh has been proposed to be increased substantially to Rs 2400.92 lakh. It was however informed that in case of CAT Plan and Bio-Diversity Management and Conservation Plan, the amount originally provided has already been deposited with the State Forest Department three years ago and the said plans are presumably under implementation, hence no change is proposed in these components. The total provision of EMP funds, which originally was Rs 1720.44 lakh, is now proposed to be increased to Rs. 5342.46 lakh..

The EAC, while recommending EC for Panan HEP for 300 MW capacity elaborately discussed the following that was covered in the 66 EAC meeting in the background of deposit of funds for CAT plan and Bio diversity Management plan to the forest department in 2009-10 and approved by EAC in 2007 while accordingly EC. The developers in their submission to the 67<sup>th</sup> EAC as Annex II C have detailed the components of CAT and Bio-diversity plans for which funds have been deposited.

- (i) Allocation of funds for Bio-diversity Component & Management plan (BCMP) formulated prior to 2007 and approved by EAC in 2007, while accordingly EC should comprehensively address the conservation / protection of plants, stating their endemics, / RET, medicinal plants and establish conservation areas of important species, identifying the locality, extend and number.
- (ii) Similarly for the Management and conservation of wildlife if any component of the project. Submerges part of the Kanchendzongha Biosphere Reserve (KBR)/ National Park affecting free movement of wild animals appropriate measures are to be undertaken so that suitable management/ conservation measures of the flora and fauna of the K.B.R. get implemented. The developers clarified that the map of the KBR/KNP has been submitted to MOEF and members of EAC (Annex II B) through their letter of 22<sup>nd</sup> May 2013 and the minimum distance of the impacted area is 1.2 km from the boundary of KBR/KNP. None of the project components falls within the KNP and its buffer zone as clarified by the Principal CCF/Chief Wild life Warden, Government of Sikkim, in his letter dated 02.11.2006 copy of which has been submitted to the committee as Annexure II-A.
- (iii) The EAC however advised that another clear map of the boundary of KNP and its buffer zone with respect to the project components be submitted.
- (iv) The EAC also advised that the proponents maintain a close liaison with the State Forest Department, the implementing agency to ensure compliance of the mitigation measures for flora /fauna /RET species, as detailed above and any additional measures pertaining to CAT and Bio-diversity management considered necessary to be undertaken with estimation of additional funds to be deposited by the developers.
- (v) The Green belt development for which the allocation has now been increased from Rs. 5.92 lakhs (2007) to Rs. 10.06 lakhs should include a mix of ornamentals for aesthetics, economically important plants and evergreen trees; avoid using exotics like *Grevilliarobusta*; use only endemic tree/ shrub



species; a detailed plan (list of species to be planted, planting rows, maintenance, protection measures, etc.) for the Green Belt should be adopted.

- (vi) Clearance from NBWL to be obtained at the earliest.

The Committee was satisfied with the gross increase proposed in the EMP provision for Fisheries Development, but suggested some internal changes in consultation with the Sikkim State Fisheries Department. The Developer agreed to reallocate the provision internally, in consultation with the State Fisheries Department within the total provision.

The Committee also enquired the details about the increase in R & R provisions of EMP. It was informed by the developer that a sum of Rs 643 lakh has been provided for construction of 100 houses in the Project Affected area, as required by the State Government. The Committee was also informed that Rs 370 lakh have been provided for protection/improvement of Namprikdang Ground, as per the cost assigned by the Sikkim State Government. A sum of Rs 735 lakh has been provided for scholarships to meritorious school students from the project affected area during the project duration, provision for Development activities has been increased to Rs 138.72 lakh and another sum of Rs 50 lakh is provided for Documenting Lepcha Cultural Heritage and Traditions. This was appreciated by the committee.

The Expert Appraisal Committee otherwise found revised EMP budget adequate, and found the project fit for environment clearance for 300 MW. Finally, the EAC observed that on receipt of the above clarification, the MoEF may consider issuing EC for 300 MW capacity.

## **2.2 Raigam HEP (126 MW) on Dalai River in Anjaw District, Arunachal Pradesh by M/s. Sai Krishnodaya Industries (P) Ltd-Scoping Clearance**

Raigam Hydroelectric Project (HEP) is located in Anjaw District of Arunachal Pradesh. It envisages utilization of flow of Dalai River, a tributary of Lohit River, for

generation of electrical power in a run-off-the-river scheme. M/s SKIL has been allotted the project for development on Build-Own-Operate-Transfer (BOOT) basis. The diversion site is located about 1.5 km upstream of Tee Pani Village and the barrage axis is located at Latitude 28° 10' 01" N, Longitude 96° 31' 12" E. Underground powerhouse is proposed at Latitude 28° 06' 28" N, Longitude 96° 32' 29" E.

Dalai River drains a catchment area of about 1703 sq.km at the proposed barrage site. The submergence area at FRL is estimated as 9.6526 ha having a gross storage of 0.396 MCM. Submergence area at MWL is 18 ha.

The Raigam HE Project envisages inter alia, the following:

- A 149 m long & 19 m high barrage (above deepest foundation level), with 11 bays with crest level at EL. 691.00 m.
- 7 m dia finished modified horse shoe-shaped 7.751 km long head race tunnel (HRT).
- A 22 m dia, 77.82 m high restricted orifice type Underground Surge shaft with a dome at the top
- A 5.4 m dia, 136.5 m long steel lined pressure shaft with three 3.20 m dia steel penstocks of length 32.9m/26.92m/45.9m will be taking from it for feeding the turbines;
- 89.6 m (L) x 18 m (B) x 49.4 (H) Powerhouse Cavern with three vertical Francis type units of 42 MW each;
- 56.6 m (L) x 13.6 m (B) x 24.5 (H) transformer cavern for housing Generator transformers & GIS
- A 205 m long tail race tunnel connected to the river, and
- Pothead yard

Total land requirement for various components and project activities is about 77.62 ha which forest land is entirely:

The entire power (126 MW) to be generated by Raigam Project is proposed to be evacuated through one 220 kV double circuit line to proposed pooling station at Tezu with line length of approximately 50 km.

The project would yield design energy of 498.6 MU in 90% dependable year and 722.5 MU in 50% dependable year.

The Project was listed for review in the 66<sup>th</sup> meeting of EAC. However, it could not be discussed as the documents were not complete in the Ministry's records. At that time, project was submitted for 141 MW installed capacity as there was no provision made in PFR about the environment flow release during monsoon and non-lean non-monsoon months. It was submitted by the consultant that PFR has been updated keeping in view the prevalent norms on environment flow i.e. 30% of inflows (in 90% DY) to be released during four monsoon months, 25% of inflows (in 90% DY) to be released during four months period of non-monsoon and non lean season and 20% average value of inflows during four leanest months in 90% DY. The environment release provision has resulted in foregoing 93.7 million units of energy annually (based on 90% Dependable Year discharges) and the optimum installed capacity is now reduced to 126 MW. The provisions of environmental flow have been now made and documents updated for final installed capacity of 126 MW.

EAC enquired if there are any more projects planned on Dalai River. It was clarified by the project proponent that there are no other project planned on Dalai River as of now and Raigam HEP is the stand alone project. Submergence of Demwe Upper HEP on Lohit river spreads along Dalai river for 900 m and the TWL of Raigam is 3 km upstream of tip of reservoir of Demwe Upper project. The Committee also inquired about the nearest protected area and what is the distance to which it was stated that Kamlang Wildlife Sanctuary is the nearest protected area and the shortest distance from project components is around 21 km.

Regarding the TOR, it was pointed out that Forest Types classification should be based upon Champion & Seth's classification and not merely based upon Forest

Working Plans as mentioned in the proposed TOR. In addition, it was suggested that sampling site selection should be scientifically done and efforts should be made to cover different forest types in the study area.

Committee also discussed that the proposed project is located in Arunachal Pradesh, which is one of the biodiversity rich states in the country. Since the fauna is rich in nocturnal species, special methods such as camera traps should be resorted to, to document their presence as the sighting of mammals is very rare, besides the regular sampling and depending solely upon secondary sources and other indirect methods of surveys.

EAC also observed that the water quality in the water-deprived stretch of about 8 km needs to be monitored on a regular basis once the construction activity starts. Such monitoring may be done at three equidistant locations in the affected reach and reported to the MoEF and State Pollution Control Board (SPCB). This should form part of Environmental Monitoring Programme and should continue throughout the construction period and a few years into the operation period.

EAC also observed that though the project envisages small barrage, it is advisable to do proper geomorphological mapping of the project area as the Lohit basin is characterized by number of faults and thrusts. Seismicity will not have much impact as the reservoir spread is very small. Nonetheless the seismicity study should be undertaken to fix seismic design parameters. The developers informed that seismic design parameter study is being undertaken by IIT, Roorkee.

EAC also commented that project area and Lohit basin in general is rich in fish fauna and it is mainly a mahseer zone, a provision therefore, be made for fish ladder in the barrage for fish migration. The project proponent agreed to keep a provision of fish ladder in the design of the barrage. The members also pointed out once the fish ladder is operational, video documentation of fish migration should be undertaken to see the efficacy of the fish ladder so provided.

EAC observed that hydrology has already been approved by CWC and power potential is based on approved hydrological series. It was further observed that although adequate environment flow provisions has been made in line with the present norms, it is important to study rainfall pattern and flow available from intermediate catchment during EIA study. EAC also asked to include daily-observed data in EIA report with a view to assess environment flow in intermediate stretch. EAC also pointed out that de-silting chamber has not been provided in the project and asked the proponent to keep a provision for the same.

With the above and based on further deliberations the EAC recommended scoping clearance for Raigam HEP with following conditions in addition to the standard ToR:

1. A site specific study may be carried-out for establishing the proper environmental flow release during monsoon, non-monsoon, non-lean and lean months. Release of minimum environmental flow must mimic the pre-dam flow pattern of the river for sustaining the aquatic bio-diversity together with downstream user need and accordingly, water withdrawal for power generation is to be regulated. Minimum environmental flow release would be 20% of average of four months of lean period and 25% of flows during non-lean and non-monsoon period corresponding to 90% dependable year. The cumulative environmental flow releases including spillage during the monsoon period should be about 30% of the cumulative inflows during the monsoon period corresponding to 90% dependable year.
2. Forest Types classification should be based upon primary survey and should follow Champion & Seth's classification and not merely based upon Forest Working Plans.
3. Sampling site selection should be scientifically done and efforts should be made to cover different forest types in the study area.
4. Camera traps should be used for documentation of mammals at few locations in study area.
5. Water quality monitoring in the intermediate stretch during construction phase should form part of Environment Monitoring Program.

6. Geomorphologic mapping of the project area to be carried out during DPR preparation.
7. Provision of fish ladder to be made in the barrage design.
8. To include observed flow at G&D site, rainfall data and intermediate catchment mapping along with its contribution in EIA report.
9. Bio-diversity study is to be carried out by associating a reputed organization to be recommended either by WII, Dehradun or by ICFRI, Dehradun.
10. De-silting chamber to be included in the project design.
11. Cumulative impact of upstream project is to be taken into account, if any.

## **12. Study Area:**

- (a) Include “ HRT area between d/s of Dam along the river course and d/s of Power House”.
- (i) For vegetation Analysis, increase the Sampling from 5 locations to 7; d/s of PH and d/s of barrage and HRT (7.75 km long) ;the additional 2 locations will be in the HRT Area (7.75 km long).
- (b) Detailed Methodology to be followed for all the parameters to be studied; Sampling locations and intensity( For example “Number and size of Quadrats and their Replications”);in Tabular form and in a map; instruments/ equipments used for the analysis Contour Map/Slope Map, Relief Map, Drainage Map, etc to be included.
- (c) Aquatic Environment: Details of physico-chemical properties to be provided.
- (d) Baseline studies: Source of secondary information will be cited wherever required and citations included in a Reference List; Economic valuation of Biodiversity and Ecosystem Services of the Forest area to be affected will be studied.
- (ii) *Biological Environment:* Include –
  - (a) General vegetation pattern will also include “Pteridophytes, Bryophytes and Lichens”, “Canes, Bamboos spp., Wild Banana (*Musa* sp.), Orchids”;
  - (b) GPS reading of occurrence of RET species will be recorded for conservation and rehabilitation purpose.

- (c) A list of all the endemic species recorded will be prepared and photographs given wherever possible.
- (d) Under faunal elements "Amphibians" will also be studied and conservation level of Animals as per IUCN Red list and Wild Life Protection Act Schedule will be given.
- (e) *Environmental Management Plan*: Wildlife under Biodiversity Conservation Plan to be included.

### **2.3 Gimliang HEP (74 MW) on Dav River in Anjaw District, Arunachal Pradesh by M/s. SaiKrishnodaya Industries (P) Ltd-Scoping Clearance**

Gimliang Hydroelectric Project (HEP) is located in Anjaw District of Arunachal Pradesh. It envisages utilization of flow of Dav River, a tributary of Lohit River, for generation of electrical power in a run-off-the-river scheme. M/s SKIL has been allotted the project for development on Build-Own-Operate-Transfer (BOOT) basis. The barrage axis is located at Latitude 28° 08' 25.05" N, Longitude 96° 38' 3.29" E. Underground powerhouse is proposed at Latitude 28° 05' 45.57" N, Longitude 96° 34' 38.25" E.

Dav River drains a catchment area of about 371.46sq.km at the proposed barrage site. The submergence area at FRL is estimated as 1.04 ha and at MWL is 3.26 ha.

The Gimliang HE Project envisages inter alia, the following:

- A 75.5 m long & 20.10 m high (above deepest foundation level) concrete Barrage with 5 bays with crest level at EL. 934.00 m.
- A Power Intake on the right bank aligned 90° to the river flow with invert level at EL. 936.00 m.
- A 3.8 m dia finished D-shaped 7.132 km long head race tunnel about (HRT).
- A 8 m dia, 81.5 m high restricted orifice type underground surge shaft with a dome at the top;
- A 2.8 m dia, 505 m long steel lined pressure shaft with two 2.0 m dia steel penstocks each of length 41 m will be taking from it for feeding the turbines;

- 68.70 m (L) x 16.5 m (B) x m (H) underground powerhouse with two vertical Francis type units of 37 MW each;
- 41.5 m (L) x 13.6 m (B) x 24.5 (H) transformer cavern for housing Generator transformers & GIS
- A 492 m long tail race tunnel connected to the river, and
- Pothead yard

Total land requirement for various components and project activities is about 79.97 ha which forest land is entirely.

The entire power (74 MW) to be generated by Gimliang Project is proposed to be evacuated through one 220 kV double circuit line to proposed pooling station at Tezu with line length of approximately 55 km.

The project would yield design energy of 290 MU in 90% dependable year and 422.6MU in 50% dependable year.

The Project was listed for review in the 66<sup>th</sup> meeting of EAC. However, it could not be discussed as the documents were not complete in the Ministry's records. At that time, project was submitted for 80 MW installed capacity as there was no provision made in PFR about the environment flow release during monsoon and non-lean non-monsoon months. It was submitted by the consultant that PFR has been updated keeping in view the prevalent norms on environment flow i.e. 30% of inflows (in 90% DY) to be released during four monsoon months, 25% of inflows (in 90% DY) to be released during four months period of non-monsoon and non lean season and 20% average value of inflows during four leanest months in 90% DY. The environment release provision has resulted foregoing 52.62 million units annually (based on 90% DY discharges) and the optimum installed capacity is reduced to 74 MW. The provisions of environmental flow have been made and documents updated for final installed capacity of 74 MW.



EAC enquired if there are any more projects planned on Dav River. It was clarified by the project proponent that there are no other project planned on Dav River as of now and Gimliang HEP is the stand alone project. Submergence of Demwe Upper HEP on Lohit river spreads along Dav river for 350 m and the TWL of Gimliang is 4.5 km upstream of tip of reservoir of Demwe Upper project. The Committee also inquired about the nearest protected area and what is the distance to which it was stated that Kamlang Wildlife Sanctuary is the nearest protected area and the shortest distance from project components is around 22 km.

Regarding the TOR, it was pointed out that Forest Types classification should be based upon Champion & Seth's classification and not merely based upon Forest Working Plans as mentioned in the proposed TOR. In addition, it was suggested that sampling site selection should be scientifically done and efforts should be made to cover different forest types in the study area.

Committee also discussed that the proposed project is located in Arunachal Pradesh, which is one of the biodiversity rich states in the country. Since the fauna is rich in nocturnal species, special methods such as camera traps should be resorted to, to document their presence as the sighting of mammals is very rare, besides the regular sampling and depending solely upon secondary sources and other indirect methods of surveys.

EAC also observed that the water quality in the water-deprived stretch of about 8.4 km needs to be monitored on a regular basis once the construction activity starts. Such monitoring may be done at three equidistant locations in the affected reach and reported to the MoEF and State Pollution Control Board (SPCB). This should form part of Environmental Monitoring Programme and should continue throughout the construction period and a few years into the operation period.

The EAC also observed that though the project envisages small barrage, it is advisable to do proper geo-morphologic mapping of the project area as the Lohit basin is characterized by number of faults and thrusts. Seismicity will not have much impact

as the reservoir spread is very small. Nonetheless the seismicity study should be undertaken to fix seismic design parameters. The developers informed that seismic design parameter study is being undertaken by IIT, Roorkee.

EAC also commented that project area and Lohit basin in general is rich in fish fauna and it is mainly a mahseer zone, a provision therefore be made for fish ladder in the barrage for fish migration. The project proponent agreed to keep a provision of fish ladder in the design of the barrage. The members also pointed out once the fish ladder is operational, video documentation of fish migration should be undertaken to see the efficacy of the fish ladder provided.

EAC observed that hydrology has already been approved by CWC and power potential is based on approved hydrological series. It is further observed that although adequate environment flow provisions has been made in line with the present norms, it is important to study rainfall pattern and flow available from intermediate catchment during EIA study. EAC also asked to include daily-observed data in EIA report with a view to assess environment flow in intermediate stretch. EAC also pointed out that de-silting chamber has not been provided in the project and asked the proponent to keep a provision for the same.

With the above and based on further deliberations, the EAC recommended scoping clearance for Gimliang HEP with following conditions in addition to the standard ToR:

1. A site specific study may be carried-out for establishing the proper environmental flow release during monsoon, non-monsoon, non-lean and lean months. Release of minimum environmental flow must mimic the pre-dam flow pattern of the river for sustaining the aquatic bio-diversity together with downstream user need and accordingly, water withdrawal for power generation is to be regulated. Minimum environmental flow release would be 20% of average of four months of lean period and 25% of flows during non-lean and non-monsoon period corresponding to 90% dependable year. The cumulative environmental flow releases including spillage

during the monsoon period should be about 30% of the cumulative inflows during the monsoon period corresponding to 90% dependable year.

2. Forest Types classification should be based upon primary survey and should follow Champion & Seth's classification and not merely based upon Forest Working Plans.
3. Sampling site selection should be scientifically done and efforts should be made to cover different forest types in the study area.
4. Camera traps should be used for documentation of mammals at few locations in study area.
5. Water quality monitoring in the intermediate stretch during construction phase should form part of Environment Monitoring Program.
6. Geomorphologic mapping of the project area to be carried out during DPR preparation.
7. Provision of fish ladder to be made in the barrage design.
8. To include observed flow at G&D site, rainfall data and intermediate catchment mapping along with its contribution in EIA report.
9. Bio-diversity study is to be carried out by associating a reputed organization to be recommended either by WII, Dehradun or by ICFRI, Dehradun.
10. De-silting chamber to be included in the project design.
11. Cumulative impact of upstream project is to be taken into account, if any.

## **12. Study Area:**

- (a) Include "HRT area between d/s of Dam along the river course and d/s of Power House".
- (i) For vegetation Analysis increase the Sampling from 5 locations to 7; the additional 2 locations will be d/s of PH and d/s of barrage and HRT (7.132km long).
- (b) Detailed Methodology to be followed for all the parameters to be studied; Sampling locations and intensity (For example "Number and size of Quadrats, replications"); in Tabular form and in a map separately for each parameters; instruments/ equipments used for the analysis and techniques followed; include Contour Map/Slope Map, Relief Map, Drainage Map, etc.

- (c) Details of physic-chemical properties to be studied under the aquatic Environment will be given.
- (d) Baseline studies: Include -Source of secondary information will be cited wherever required and citations included in a Reference List; Economic valuation of Biodiversity and Ecosystem Services of the Forest area to be affected will be studied.
- (iii) *Biological Environment*: Include –
  - (e) General vegetation pattern will also include “Pteridophytes, Bryophytes and Lichens”, “Canes, Bamboos spp., Wild Banana (*Musa* sp.), Orchids”;
  - (f) GPS reading of occurrence of RET species will be recorded for conservation and rehabilitation purpose.
  - (g) A list of all the endemic species recorded will be prepared and photographs given wherever possible.
  - (h) Under faunal elements “Amphibians” will also be studied and conservation level of Animals as per IUCN Red list and Wild Life Protection Act Schedule will be given.
  - (i) *Environmental Management Plan*: Wildlife under Biodiversity Conservation Plan to be included.

#### **2.4 Yamne Stage-I HEP (120 MW) Project in Upper Siang District of Arunachal Pradesh by M/s. SS Yamne Power Pvt. Ltd – For reconsideration of TOR.**

Yamne Stage -I Hydro-electric Project of 120 MW, by M/s SS Yamne Power Private Limited, a Run-of-River scheme with diurnal pondage is proposed on the Yamne river, between EL  $\pm 735$  m up-to EL  $\pm 565$  m in the Upper Siang district of Arunachal Pradesh. Due to typographical error, the capacity was shown as 90 MW in the Agenda. The Dam site is located about 700 m downstream of the confluence of Yamming Nala with Yamne River, a left bank tributary of Yamne River. The total catchment area up to the Dam site is 625 sq km. The project is to construct a 47 m high Dam from average River bed level with 4 nos. of spillway which are controlled by radial gates. A surface powerhouse is proposed on the left bank of river Yamne. The design energy would be 491 million units (MU) in a 90% dependable year at 95% plant availability.

The project was considered in the 65<sup>th</sup> EAC meeting when the project proponent submitted the proposal for 135 MW installed capacity. The EAC found this on higher side and asked the developer to come up with a realistic installed capacity taking into account the latest norms for release towards meeting environmental flow.

The Committee noted that project proponent revised the minimum environmental release as per recommendations by the EAC i.e. 20 % in lean season, 25% in pre & post monsoon and 30% in the monsoon season. Based on the release of environmental flows, installed capacity of the project has been worked to be 120 MW with corresponding design discharge is 83.39 cumec.

The layout of the Project, as proposed by the Project proponent was deliberated by EAC viz-a-viz other alternatives studied and presented. In view of the meeting above mentioned environmental flows, the committee accepted the proposal of the project with 11.2 km HRT. Further, the EAC recommended that discharges from the intermediate catchment between the dam and powerhouse be assessed by the project proponent and incorporate in EIA/EMP reports.

The Project proponent informed the Committee that approval vide letter no CE(M)/HPD/W-81/2013-14/381-83 dated 27<sup>th</sup> May, 2013 from the Govt. of Arunachal Pradesh pertaining to allotted reach of Yamne river for developing this project has been obtained and the letter was submitted during the meeting.

On the issue of using Primary three season data collected from the field, the Committee recommended that since the data was already 3 years old and also that earlier ToR is not valid, so this needs to be considered as a case of Fresh ToR. Thus, the project developer needs to collect three seasons of primary data as per the existing MoEF norms. This was accepted by the project developer that fresh field data would be collected with effect from June 2013.

The Influence zone map of the Project was revised by the developer as recommended by the EAC and same area shall be considered for EIA/EMP studies. The project developer informed the Committee that recommendations for keeping minimum free stretch between TWL of Yamne stage I and downstream located project's FRL as about 3.68 km shall be maintained.

The Committee recommended that micro seismic monitoring station at project site be established for recording micro-seismic data for one year, which may be incorporated in the DPR. This was accepted by the project proponents.

The Committee recommended that Green Belt development plan should be prepared and the same should be presented in detail in the EIA/EMP reports. This was also accepted by the Project developers.

The committee recommended that the silt data should be collected and silt studies should be carried out at the DPR and EIA/EMP stage. Appropriate statutory authorities should examine the Silt management aspects of the Project and adequate provisions in terms of required civil structures and/or provision for regular reservoir drawdown flushing etc. also needs to be examined and provided at that stage.

EAC also observed that the water quality in the water-deprived stretch of about 11.2 km needs to be monitored on a regular basis once the construction activity starts. Such monitoring may be done at three equidistant locations in the affected reach and reported to the MoEF and State Pollution Control Board (SPCB). This should form part of Environmental Monitoring Programme and should continue throughout the construction period and a few years into the operation period.

After detailed deliberation and clarifications, the Committee approved for issuing a fresh ToR with the following additional stipulations in addition to standard ToR:

- A site specific study may be carried-out for establishing the proper environmental flow release during monsoon, non-monsoon, non-lean and lean months. Release of minimum environmental flow must mimic the pre-dam flow pattern of the river for sustaining the aquatic bio-diversity together with downstream user need and accordingly, water withdrawal for power generation is to be regulated. Minimum environmental flow release would be 20% of average of four months of lean period and 25% of flows during non-lean and non-monsoon period corresponding to 90% dependable year. The cumulative environmental flow releases including spillage during the monsoon period should be about 30% of

the cumulative inflows during the monsoon period corresponding to 90% dependable year.

- With the above minimum Environmental releases Power potential of the project is worked out to be 120 MW with design discharge of 83.39 cumecs, FRL at El. 735 m and TWL at El. 565 m. However the Project proponents shall obtain approval of the Appropriate Statutory Authorities for the Project's Installed Capacity.
- Three season field studies should to be conducted as per revised layout taking the case as fresh ToR and considering present MoEF norms.
- Discharge contribution of intermediate tributaries to be noted and given in detailed DPR and EIA/EMP reports.
- Free stretch of 3.68 km to be maintained between TWL of Yamne stage I and downstream located project's FRL.
- Micro Seismic Earthquake monitoring station to be established and data for one year is to be collected.
- In case of Green Belt development plan proposed in EIA/EMP reports, land requirement for Green Development Plan have to be considered in DPR phase itself.
- Sedimentation studies to be carried out and design aspects for Silt Management of the project should be got approved by the appropriate Authority.

## **2.5 Pemashelpu 90MW Hydro Electric Project on River Yargyap Chhu in West Siang District of Arunachal Pradesh by M/s. Mechuka Hydro Power Pvt Ltd- Extension of Validity of ToR and intimation for change of barrage location etc.**

The project is located on Yargyap Chhu river, which is a right bank tributary of Siyom river. Scoping clearance was accorded to Pemashelpu Hydro-electric project vide MoEF letter No:J.12011/32/2009-IA.I dated 25.08.2009 for 96MW installed capacity, which is valid for a period of 4 years i.e. till August 24, 2013. Therefore,

extension of Scoping clearance is sought to complete DPR and EIA/EMP studies for Public Hearing.

The project proponent informed that during the process of investigation, due to geological conditions and as a land slide occurred near initially planned site, barrage axis needed to be shifted about 300 m upstream. This has resulted in change in FRL from 2220 m to 2236 m to keep waters to capacity in the reservoir almost same. Govt. of Arunachal Pradesh has approved revised FRL of 2236m vide its letter No. PWRS/PHD/2009/54-55 dated 7<sup>th</sup> Jan 2013. Therefore, revised scoping clearance has also been sought for change in barrage axis.

The Pemashelpu (90 MW) HEP was discussed in 66<sup>th</sup> meeting of EAC where committee reviewed in detail the reasons for shift of barrage axis and delay in completion of EIA/EMP reports within the required time frame and thus, need for extension of scoping clearance. The Committee made certain observations and asked the developer to respond. Point-wise response was submitted including submission of updated Form I. This was reviewed by the committee. A presentation was made by Consultant on various observations made and their responses. These are elucidated below:

The Committee asked to explain the longitudinal profile of Yargyap Chhu showing all the seven planned hydropower projects with their levels and free flowing stretches between adjacent projects. It was explained with a L-section that Pemashelpu (TWL1955m) is the uppermost project on Yargyap Chhu with Kangtangshri HEP as immediate downstream project with FRL of 1900m. Free flowing stretch is about 15 Km between TWL of Pemashelpu and FRL of Kangtangshri HEP.

The project proponent submitted that there was a typographical error in the minutes of the 66th meeting of EAC with regard to Pemashelpu HEP. Column heading of the comparative statement should be reversed i.e. the “original” needs to be replaced with “New” & “New” needs to be replaced with “Old”. This has also resulted in one of the observations saying that shift of barrage axis will increase land requirement



which may result in more Project Affected Family (PAF). It was clarified that the shift of barrage axis will lead to reduced land requirement from 63 ha (in original ToR) to 55.25 ha and as such it would not lead to increase in area of submergence and number of PAFs.

Water availability series has been approved by CWC/CEA for a 25 year period 1978-79 to 2008-09 and the year 1978-79 is considered as the 90% dependable year. In this year against design drawal of 37.73 Cumec, discharges as high as 77 Cumec was available. Further, spills are available almost 100 days out of 120 days in the monsoon that correspond to 25% of monsoon yield notwithstanding the fact that based on the observed discharged from 2008 to 2012 maximum daily discharge peaks of 150 to 540 Cumec have been observed several times every year. The releases downstream of the barrage are therefore considered adequate for the monsoon. Project proponent agreed to ensure that environment flow release criteria taken in the DPR will be in line with the current norms based on 90% dependable year of the approved 10 daily flow series. In monsoon season (June-Sept) 30% of discharges will be released, in non-monsoon and non-lean season (Oct, Nov, Apr and May) 25% of discharges will be released and during four leanest months (Dec-Mar), 20% of the average of the four leanest months discharge will be released. A site specific study on the adequacy of environmental flow release was agreed to be conducted in the EIA study.

With the above, the EAC agreed for one year extension subject to following addition conditions:

- A site specific study may be carried-out for establishing the proper environmental flow release during monsoon, non-monsoon, non-lean and lean months. Release of minimum environmental flow must mimic the pre-dam flow pattern of the river for sustaining the aquatic bio-diversity together with downstream user need and accordingly, water withdrawal for power generation is to be regulated. Minimum environmental flow release would be 20% of average of four months of lean period and 25% of flows during non-lean and non-monsoon period corresponding to 90% dependable year. The cumulative

environmental flow releases including spillage during the monsoon period should be about 30% of the cumulative inflows during the monsoon period corresponding to 90% dependable year.

- The study area was agreed to cover the HRT downstream of the barrage at the revised location.
- Specific study on the impact of Dibang Biosphere Reserve is to be carried out.
- Muck disposal norm of leaving adequate clearance from river/valley edge will be adhered to.
- Environmental sensitivity study for assessing impact on /mitigation for RET species will be carried out to prepare the EMP.
- The developers have collected both primary and secondary base line data of which the primary data collected only over the last three years will be utilized in the EIA study and preparation of EMP.

Other observations mainly related to Form I and TOR have been complied with. Committee, based on the comparison and explanations also agreed to the shift of barrage axis by 300 m upstream.

## **2.6 JELAM TAMAK (108 MW) H.E. PROJECT IN DISTRICT CHAMOLI OF UTTARAKHAND BY THDC INDIA LTD–FOR ENVIRONMENTAL CLEARANCE**

Jelam Tamak H.E. Project is located in the Joshimath sub division of Chamoli district in Uttarakhand. The project envisages construction of a 28 m high barrage, at an elevation of 2623.5 m, HRT of 4.4 km length, an underground powerhouse and tailrace tunnel of 308 m . The installed Capacity of the project is 108 MW (3 x 36 MW). The annual energy generation in a 90% dependable year is 505,12 GWh. The estimated cost of the project (excluding transmission) is Rs. 1290.25 cr. The levellised tariff is Rs. 5.22 per unit. The total land required for the project activities is around 96.27 ha. which includes 88.29 ha forest land, 7.98 ha private land.

The project developers submitted compliance of the observations of EAC in its 65<sup>th</sup> meeting held on 22 March 2013 when it had been considered for environmental clearance. Accordingly the Jelam Tamak H.E. project was reconsidered for the

environmental clearance in this meeting. The point wise replies to the observations were discussed in detail during the meeting. The project developers submitted updated copies of EIA and EMP reports along with comprehensive supplementary information report.

A detailed presentation with respect to compliance of observations was made before the EAC. Project developers submitted all compliance viz. compliance of TOR, site specific studies to determine the seismic design parameters by IIT Roorkee, barrage breach analyses including the inundation map, detailed GLOF study by National Institute of Hydrology, Roorkee, approval of seismic design coefficient by NCSDP, Govt of India, cumulative impacts of upstream project, CWC optimization studies for barrage discharge capacity, updated chapters on flora and fauna, updated chapters on Biodiversity Management Plan, Fishery Management Plan, Compensatory Afforestation Plan, Resettlement & Rehabilitation plan including Local Area Development Plan etc.

The gist of the presentation and discussion held is given below:

1. The Dam/Barrage Break Analysis has been carried out as per the HEC-RAS version 4.1.0 (latest) model. There are about 6 human settlements in the radius of 10 km from the central axis of the proposed Barrage. No major structure or Bridge etc. are available on the d/s side within the reach of JTHEP. All the villages / settlements are situated at higher elevation than the maximum flood level generated due to worst case scenario of barrage breach. No damage in the downstream side is anticipated due to the failure of the Jelam Tamak barrage.
2. As per the GLOF Study Report carried out by NIH Roorkee, there is no dangerous lake in the Catchment area of the Project. Further CWC have intimated that the GLOF studies may not be considered for working out design flood for the project and a design flood value of 1906 cumecs computed earlier by hydro-metrological approach may be adopted for the planning of the project.
3. The site specific study of seismic design earthquake parameters has been carried out by IIT Roorkee. The report has been examined and approved by the National Committee on Seismic Design Parameters (NCSDP) of Govt. of India. Occurrence of

Earthquake around Jelam Tamak Project Site from the year 1720 to 2007 with magnitude and depth are considered in the Report.

4. The construction periods and date of start of both projects vary significantly. The proposed date of start of Construction activities at Jelam Tamak HEP is April' 2014 where as the proposed date for Malari Jelam HEP is April' 2017. Total construction period for Jelam Tamak HEP is 52 months where as it is 42 months for Malari Jelam HEP (65 MW). The Manpower at Jelam Tamak HEP shall be 2400 during the peak time of construction while as the expected Manpower for Malari Jelam shall be 1600 during peak time of construction. The overlapping period for the two projects is 16 months only during which the joint manpower peak shall be 1800 which is less than 2400 of JTHEP. No significant additional burden/Impact shall be there due to the Malari Jelam Project which shall take off much later.
5. The provision of merit scholarship in Local Area Development plan was discussed and it was desired by EAC to increase the same to Rs. 40.00 lakhs instead of Rs. 20.00 lakhs proposed in the report.
6. The complete R&R plan at chapter 13 of EMP has been revised as per the directions of EAC/ MoEF. A separate budget provision has been made for Local area development Plan amounting to Rs. 598.00 lakhs. As per the direction of EAC it was ensured that this budget will be in addition to CSR budget.
7. The budget of Fisheries Management Plan has been enhanced to Rs. 55.00 lakhs as per suggestions of EAC. After the detailed discussion on the feasibility of fish ladder in no fish zone, it was decided that fish ladder is not required in the barrage of Jelam Tamak HEP.
8. The floral and faunal components in the study area were discussed in detail. A detailed list of cryptogams including bryophytes lichens and pteridophytes have been provided in the report. The floral composition in the project components was included in the report. The habitat improvement plan was included in the report as per the suggestion of EAC. The Natural Resource Management Plan/Joint Forest Management Plan has been revised and updated.

9. The total cost estimates for implementation of various plans under EMP has been increased substantially from Rs. 5152.17 lakhs to Rs. 5429.17 lakhs.
10. Almost all compliance was found well addressed and satisfactory by the EAC save the following:
- The management plan of Nandadevi Biosphere Reserve (NDBR) is still not included in the reference list and it is not clear from the text in supplementary information that it has been referred to.
  - The proposed project has been identified as one with very high impact on terrestrial fauna in the Assessment of Cumulative Impacts of Hydroelectric Projects on Aquatic and Terrestrial Biodiversity in Alaknanda and Bhagirathi Basins, Uttarakhand report (pp 184-185). As only one project Malari-Jeelam is being planned upstream the cumulative impact on Dhaul Ganga River can be considered when project features, and environmental floor as well as biodiversity studies are considered for the upper project and its EIA studies are considered.
  - The MOEF may suitably incorporate this aspect while issuing the EC to Jeelam – Tamak HE project which the EAC found as having adequate environmental mitigation measures in the EMP critically examined by the committee.

**2.7 Mohanpura Major Irrigation Project in Rajgarh District of Madhya Pradesh by Water Resources Department, Government of Madhya Pradesh – For consideration of Environmental Clearance.**

Mohanpura Multipurpose Project is planned across Newaj River in Rajgarh District of M.P. intercepting 3825 km<sup>2</sup> of basin area. The project has a composite dam 2640m long, submerging 7057 ha. of land, that affect 4782 families. Land required for canals is estimated as 152 ha.

The proposed Mohanpura dam shall be constructed near village Banskhedhi in district Rajgarh, Madhya Pradesh. The coordinates of the dam site are 23<sup>0</sup>57'54" N and 76<sup>0</sup>46'37" E. The dam is proposed to be constructed across river Newaj having a

catchment area of 3726 sq. km. The total cost of the project is envisaged as Rs. 282734.35 Lakhs.

The project with a Live Storage Capacity of 539.42 MCM envisages annual irrigation of 97750 ha. comprising of 35500 ha. in Kharif and 62250 ha. in Rabi over a CCA of 65000 ha. Water requirement is assessed as.

- a) For irrigation – 352.834 MCM
  - b) For drinking water – 20 MCM
  - c) For industrial use – 60 MCM
- Total – 432.834 MCM

### **Irrigation Planning:**

The project has a 75% dependable yield estimated at 749.71 MCM for surface water and 74.971 MCM for ground water totaling 824.68 MCM. The basin receives an annual rainfall of the order of 800 – 1000 mm.

There is an anomaly at pg. 190 which shows upstream surface water utilization as 139.31 MCM against a figure of 253.038 MCM for constructed projects shown at pg. 10 – 12. This needs clarification as the 75% dependable yield would reduce considerably.

The irrigation network is planned as a combination of :

- a) Flow irrigation through two gravity canals off taking from the reservoir on the left and right of the dam commanding 11235 ha. (net) and 16050 ha (gross).
- b) Pressurized irrigation by lifting from the reservoir on the left at Berampur and conveying a 18.775 km long pressure main to lift water to a delivery system near Parliyakhedhi tank at RL470 to command a CCA of 53765 ha.

The distribution network for pressure irrigation is shown through seven distributaries D 1 through D7 totalling 122 km in length, all of taking from the delivery cistern and linked to tanks enroute. A tank at Parliyakhedhi serves as a balancing reservoir. The

modality of release and distribution of water to these pressure canals could not be explained clearly by the developers. It was explained that no sub distributaries or minors as flow canals are planned as is normally done for an irrigation system, but by regulated pressure outlets emerging from small tanks. This enables a flexible operation to farmers for diversified cropping, although the cropping pattern shows a monocrop of soyabean of in Kharif and principally wheat in Rabi with grams (percentage not stated). The developers/consultant indicated that the system efficiency (pg. 10-15 of report by WAPCOS) is 80% because of non-ponded irrigation practice suggested against 54% for conventional surface ponded irrigation. This was considered to be on the higher side by the EAC and developers were asked to provide enough justification.

SANDRP, a New Delhi based reputed NGO has written a letter to the EAC seeking clarifications on the project features. The developers were asked to clarify doubts raised in the above letters relating to the project features that contradict with the assumptions made in the NWDA study of Parbati – Kalisindh – Chambal Scheme, a major issue is that the NWDA scheme envisaged a gross and live storage provision of 140 and 52.5 MCM respectively against the present proposal 616.27 and 539.42 MCM respectively because the NWDA proposed transferring 464 MCM from Patanpur dam to Mohanpura Reservoir to reduce the large submergence of Mohanpura Reservoir. The developers clarified that the NWDA scheme as not been accepted by the M.P. Government and is not likely to be implemented in the near future. The M. P. Government wants immediate implementation of Mohanpura Project for poverty alleviation of the backward Rajgarh District. The EAC however sought clarification on whether the Chambal River Sanctuary would be impacted, in which case clearance of NBWL would be necessary.

Other issues raised were:

- a) Very high submergence and related R & R problems which were alleged to be inadequately addressed in the M. P. Proposal and lack of a proper S. I. A. Study.
- b) No Command Area Development Plan formulated and therefore introduction of irrigation may cause environmental degradation.

The EAC sought detailed point wise clarification on each issue raised by SANDRP for which the developers agreed to provide comprehensive compliance. The letter of SANDRP was handed over to the developers.

In this context the EAC wanted to know the exact manner in which irrigation and drainage would be managed in the flow command (even with pressurized irrigation) at the farm level. It is not clear as to how distributaries from main storage on the left and there off taking channels will draw and distribute water to function as pressurized irrigation. The developer indicated advantage of flexibility of the diversified cropping pattern available with provision of a small storage tank from each chak and allocation of a certain quantum of water for the irrigation season. This the EAC considered as contradictory with a monocrop of soyabin in Kharif and wheat in Rabi. The developers stated that the transition to a multiple cropping practice will take a few years which is an innovative approach for economizing water use. The proposal is a model based on Rajasthan practice.

In view of the fact that the Command Area management of irrigation and drainage (such as field channels and field drains) need a critical review the developers were asked to provide detailed channels /sub channel wise information of a 10,000 ha. or two 5,000 ha Patches in the command of D1 and D3 distributaries on the left pressurized irrigation command.

The geologic units over the dam site and upstream areas are Deccan Traps of Malwa Plateau, which are characterized by the two types of basaltic rocks. Upper sequence is usually weathered due to long exposure time in eruption as well as degree of weathering. In addition, basic lithologic characteristics, weathering and fracturing patterns, tend to change dramatically over short distances making correlation between flows difficult. The sheet jointing is most prevalent. The lower one is compact basalt is more fine grained than the vesicular basalt with various fracture patterns. They usually dominated by vertical or sub-vertical (columnar) joints. The typical nature of the rock types in the project area becomes highly permeable for the groundwater recharge and requires the detailed geological and structural investigations. It is established that



columnar basalt, being highly fractured vertically, would most likely generate vertical preferential flow of water while massive basalt, being generally equally fractured vertically and horizontally, would have relatively similar amounts of flow in either direction.

Since, it is an irrigation project and water impoundment is proposed for many months in a year for providing the irrigation facilities, therefore these situations of groundwater recharge should be precisely addressed. The report envisages the brief description of the geology, which is undertaken by GSI does not provide any detailed map of the geological study, however, the recommendations are made mainly very generalized in nature. The map enclosed with the report is not readable. It is, therefore, **recommended** to undertake the detailed geological and structural mapping of the area and provide the detailed map with inferences.

Social Impact Assessment (SIA) report has not been submitted prior to 67<sup>th</sup> EAC meeting. The Detailed Project Report Volume – VI (Social Impact Assessment) prepared by the Chief Engineer, Chambal Betwa Basin, Water Resources Department, Govt. of Madhya Pradesh, was submitted after the presentation by the Project proponents. The said SIA report contains some observations and analysis of data collected through question schedule and group discussions.

The report states that all the 36 villages will be affected due to submergence, out of which 27 are inhabited (Abadi village). Out of these, nine project affected villages have been surveyed and 274 Project Affected Persons (PAP) have been interviewed. While the number of affected villages surveyed (one-third of total inhabited villages) seems justified, the sample size of PAP does not appear to be justified considering the fact that 4,778 families will be affected. The SIA should provide the total number of Project Affected Families (PAF) and PAP. Mere mention as to on what basis these 274 respondents were selected is not sufficient. The sampling method does not appear to be transparent also.

The EIA/SIA does not include the list of the Project Affected Persons in the Annexure provided. At this stage, the report must include the list of all PAF along with details of their land/property to be acquired for the project.

Though the SIA emphasizes that in general the PAF are in agreement with the project developers and there is not much resistance amongst the local population (p. 4), the overview of project affected villages indicates that at least in two surveyed villages, namely, Karadiya and Ghoghadiya, the villagers are not very keen to have a dam on river Newaj (p. 35-37). The information on economic condition too appear to be contradictory. On one hand the report says there are no other sources of livelihood due to small land holdings (p. 45), on the other hand, it says livestock rearing is a common livelihood. Similarly, once it says there are 50 joint families (table 13), in another context it says there are 141 joint families (table 26). In section V on Income-Expenditure Details, the report gives information only on income and savings and there is no information on expenditure behaviour of the villagers. The consultant should provide such details in the report.

The SIA contains plenty of tables and graphs on socio-economic status of the surveyed villages and conveys that the drought-prone district needs irrigation at any cost but does not address the social stress. The report should have given a fair assessment of social stress also.

In the Annexure 1, the SIA consultant has provided a schedule/Questionnaire for Social Impact Assessment of Project Affected Families (PAF) which was presumably prepared for another project, "RUNJ Medium Irrigation Project". The model questionnaire contains a number of items such as, details about size and other features of land (4.5), normal/usual family expenditure (5.3), small industry in sample village (Block 6), etc. which are unrepresented in the present study for Mohanpura Major Irrigation Project. There is no harm in following a model, but the consultant should have been more cautious in dealing with such format.

With regard to the provision of environmental flow, the developer showed that considerable spills are occurring over 75% of the years study for simulation, that work out to more than 30% of the monsoon flow.

The developer was asked to clarify /submit detailed compliance on the following points also for reconsideration of the proposal:

- It appears that lifting of water through a pipe under pressure has been considered as 'pressure irrigation' by the Project Authorities. This concept of 'pressure irrigation' is incorrect vis-à-vis what is commonly understood by pressure irrigation (e.g., sprinkling, drip, etc. for water application to the crop land.
- The project proponents to clarify that the area under pressure irrigation is actually under flow irrigation. The mechanism to deliver water to fields using pressure irrigation to be given.
- For pressure irrigation, filter at the intake be included and its head losses be included in the overall calculation of energy requirements.
- In Kharif irrigation, only one crop is recommended. Likewise, in rabi season, only wheat and gram have been suggested as a part of cropping pattern. This needs to be relooked.
- A Command Area Development Plan be provided.
- Details of drainage network planning be included in the report.
- The discharge data for Aklera G&D site be given.
- Rainfall and run-off values should be given in mm since Table-5.1 shows linear co-relation in mm. in concurrent period
- 75%flow series gives a total yield of catchment as 25.77 cumec-10 days in 75% dependable year. Whereas in table-5.2 the 75% dependable yield is given as 749.71 Mcm. The same needs to be corrected. Corresponding corrections at relevant sections in Volume-II , EMP report be also done.
- Give a table showing 1980-81(75%year dependability) inflow series, riparian flow release, evaporation loss, U/s existing use, Industrial and drinking release and net yield available to meet irrigation requirement.
- While computing water requirement for different crops, were the various losses/ irrigation efficiency considered?
- The steep rising limb of Synthetic unit hydrograph is quite steep, which needs to be corrected.
- Source of silt rate of 0.75 Acre-ft/sq mile/year be given and it should be converted in ha-m/sq km/yr.
- Besides new zero elevation, give the loss in live storage every at five year interval.
- Give a plan showing flood affected areas due to dam break
- The source of data for faunal population is to be provided. The source of secondary information may be provided if used.
- The avifaunal list is good but requires a lot of typographical corrections. Also some of the species such as Golden Plover and Redshank have been shown as resident although they are migratory.

- The list of reptiles appears deficient for this hot and dry area of central India. This needs to be updated.
- The methodology for faunal surveys has not been provided properly. The faunal part in section 4.2.2 is too brief and fails to provide any idea about the primary effort. The source of secondary information may be provided if used.
- The presence/absence of Blackbuck, a schedule I species, may be commented upon since it is expected in the area.
- The suggestion of providing artificial nest boxes should primarily be restricted to the area close to the submergence zone to provide nesting opportunities to the birds which loose the same owing to submergence.
- The idea of hiring a qualified person for implementation of this is good.
- Please explain the statement 'no major wildlife is available in the project area' in section 1.2.4.
- Suggestions on eco-tourism should be implemented through a committee with adequate representation from the local communities.
- Though various aspects of SIA have been included in the report in various sections of EIA and EMP volume , it should be compiled in a separate volume.
- Detailed geological and structural mapping of the area is to be undertaken in order to provide the detailed map with inferences.
- On Social Impact Assessment (SIA), following information have to be provided :-
  - All PAFs along with details of their land/property to be acquired for the project.
  - Expenditure behavior of the PAFs & PAPs in addition to giving income & savings.
  - Likely social stress on the PAFs.
  - Transparent method for choosing sample villages to be followed.
  - Depending upon the site of 4778 PAFs, sample survey should cover more villages.

### **3.0 Other item**

#### **3.1 Kundah Pumped Storage HEP (450 MW) Project in Nilgiri District of Tamil Nadu by M/s. TNGEDCO Ltd – For reconsideration of extension of the validity of Environmental Clearance.**

The Chief Engineer, TNGEDCO presented the details of the project. The Ministry granted environmental clearance (EC) to Kundah Pumped Storage HEP (450 MW) Project on 8.5.2007, as per EIA Notification, 2006 with a validity period of 5 years i.e. till 7.5.2012 from the date of issue of clearance for commencement of construction work. The project proponent has requested the Ministry to extend the validity of the EC for 5 more years.

The project was earlier considered by EAC in its meeting held on 1-2<sup>nd</sup> February, 2013. The committee sought details on the action taken during initial 5 years along with physical and financial progress.

The project proponent has mentioned that due to financial constraint, the physical and financial progress has not been achieved as envisaged. The TNGEDCO Ltd has spent Rs.10.00 crores for making the payment to Forest department towards land acquisition for compensatory afforestation & diversion of forest land diversion purpose. The pre- engineering works are underway. The project proponent has also mentioned that engaging the Engineering consultants for project execution is to be finalized shortly and tenders are being called. The project implementation will be initiated during this financial year 2013-2014. Therefore, the project proponent requested for condonation of delay in initiating the physical works of the project. They have however, taken up some works like land acquisition process and diversion of forest land etc. and informed that major works will be taken-up during the current financial year (2013-2014).

The committee after detailed deliberations observed that physical & financial progress made in the project is meagre. While the major works were not initiated, the land acquisition & diversion of forest land process has been started during 2008-09 and 2011-12. The committee noted that lack of finance was primary reason for not achieving visible physical progress. The TNGEDCO assured the EAC that works on the project will begin on ground by the end of current fiscal. In view of the explanation of the project proponent, extension of validity of the EC in the instant case can be considered as special case by the Ministry till June, 2014 to enable them to commence work. If, however, the project proponent is found wanting to show physical works by that time, the validity of the EC may be forfeited and the project proponent shall come for fresh EC.

### **3.2 Extension of the Validity for TOR of Simang-I HEP (67 MW) project in East Siang District, Arunachal Pradesh by M/s. Lower Simang Power Pvt. Ltd & Simang-II HEP (66 MW) project in East Kameng District, Arunachal Pradesh by M/s. Upper Simang Power Pvt. Ltd- For reconsideration of extension of the validity of TOR**

The project proponent requested the Ministry for the extension of TOR validity for 1 year for Simang-I HEP (67 MW) & Simang-II HEP (66 MW) projects in Arunachal Pradesh on the plea that the draft EIA/EMP reports have been submitted to Arunachal Pradesh State Pollution Control Board (APSPCB) to conduct Public Hearing. The Public Hearing is yet to be conducted by the APSPCB and is delayed. After conducting the public hearing, the final EIA/EMP reports will be prepared and submitted to MoEF for final clearance. Projects were taken up in the last EAC meeting held on 3-4<sup>th</sup> May 2013

and project proponent was asked to submit the chronological event of activities associated with EIA/EMP reports. Above details have been submitted by the project proponent

The EAC was informed the following:

- The ToR validity dates of the Simang-I (67 MW) HEP & Simang-II (66 MW) HEP are May 11, 2013 and May 19, 2013, respectively.
- Draft EIA/EMP reports have been submitted to APSPCB by the project proponent on October 31, 2012.
- APSPCB has not been able to fix any date for Public Hearing so far.
- Public Hearings was delayed due to the recent Panchayat Elections in the State and is likely to take some more time.
- In view of the anticipated delay in conducting Public Hearing, the Project Proponent requested for time extension purely on administrative ground for one year.

EAC noted that there has been no change in project parameters and the time extension sought is purely on delay in conducting public hearing. The EAC thus, recommended to grant the extension of validity of TORs by another one year.

### **3.3 Extension of the Validity Period of TOR for Subansiri Upper HEP (2000 MW) in Upper Subansiri District of Arunachal Pradesh by M/s. KSK Upper Subansiri Hydro Pvt Ltd.**

The project proponent requested the Ministry for the extension of TOR validity period for 1 year in respect of Upper Subansiri HEP (2000 MW) project in Arunachal Pradesh on the plea that property survey and socio-economic survey could not be completed on time primarily due to non availability of land records. The Ministry granted TOR to this project on 28.4.2011 with two years of validity period which has expired on 28.4.2013. In this regard, the project proponent also informed the following:

- Completion of property survey is expected by the end of December, 2013
- Preparation of Socio-Economic and R& R report expected to be completed by the end of January, 2013
- Submission of Draft EIA / EMP report to SPCB is expected by end of January, 2014
- Submission of Final EIA& EMP report expected by mid April, 2014
- There has been no change in project parameters and thus no change in the scope of the project has been envisaged.

- These remaining activities could be completed in next another 1 year period.

The EAC recommended extension of validity period for 1 year i.e. up-to 27.4.2014, but asked the project proponent to keep target date for submission of draft EIA/EMP by early January, 2013. Accordingly all predecessor activities may be completed before this date. This will help maintaining the date for final submission of EIA/EMP and preempt any further delay.

#### **4.0 Any other item with the permission of Chair**

With the permission of the Chairman, the following items were considered:

#### **4.1 Extension of the Validity Period of TOR for Kynshi Stage-I HEP (270 MW) in West Khasi Hill District of Meghalaya by M/s. Athena Kynshi Power Pvt Ltd.**

The project proponent requested the Ministry for the extension of TOR validity for 1 year for Kynshi Stage-I HEP (270 MW) project in Meghalaya on the plea that substantial progress has been made in collection of seasonal baseline data for various aspects and EIA/EMP study is in advanced stage. The Ministry granted TOR to this project on 13.1.2011 for 300 MW capacity. Two year, validity period expired on 13.1.2013. The project proponent also informed the following:

- The power potential studies have been submitted to CEA. While examining the case, the CEA “in principal” has approved the installed capacity of the project as 270 MW with FRL at EL 940 m & TWL at EL 320 m.
- The downward revision in capacity has not resulted in any change of the project parameters/layout, submergence area of the project.
- The TWL moved upwards from 320 m to 350 m.
- The study area has been reduced and remained within the study as per the approved TOR.

The EAC noted that reduction in capacity of 270 MW of Kynshi Stage-I HEP project has not resulted in any change of parameters and study area. Thus, EAC agreed for the change of capacity to 270 MW and recommended extension of validity for 1 year i.e. up-to 13.1.2014. The committee also agreed for the utilization of the baseline data already collected on the project with the condition that the primary data cannot be more than 3 years old for preparation of EIA/EMP.

Meeting ended with a vote of thanks to the chair.

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**List of EAC members and Project Proponents who attended 67<sup>th</sup> Meeting of Expert Appraisal Committee for River Valley & Hydro Electric Power Projects held on 6<sup>th</sup> June, 2013 in New Delhi**

**A. Members of EAC**

- |     |                                |   |                                   |
|-----|--------------------------------|---|-----------------------------------|
| 1.  | Dr. B. P. Das                  | - | Vice-Chairman                     |
| 2.  | Dr. Arun Kumar                 | - | Member                            |
| 3.  | Dr. K. D. Joshi                | - | Member                            |
| 4.  | Dr. (Mrs.) Maitrayee Choudhary | - | Member                            |
| 5.  | Shri G. L. Bansal              | - | Member                            |
| 6.  | Dr. Dhananjay Mohan            | - | Member                            |
| 7.  | Dr. A. K. Bhattacharya         | - | Member                            |
| 8.  | Prof. S. K. Mazumder           | - | Member                            |
| 9.  | Shri B. B. Barman              | - | Member Secretary & Director, MoEF |
| 10. | Dr. P. V. Subba Rao            | - | MoEF                              |

**B. Panan HEP ( 300 MW) Project in North Sikkim, Sikkim by M/s. Himagiri Hydro Energy For reconsideration of Environmental Clearance for enhanced capacity.**

- |    |                      |   |                            |
|----|----------------------|---|----------------------------|
| 1. | Shri Shekhar Gupta   | - | Chief Executive Officer    |
| 2. | Shri T. Gopal Reddy  | - | Sr. General Manager        |
| 3. | Shri G. S. Rao       | - | General Manager            |
| 4. | Shri T. D. Negi      | - | Additional General Manager |
| 5. | Shri Arun Bhaskar    | - | Consultant                 |
| 6. | Shri Ravinder Bhatia | - | Consultant                 |

**C. Raigam HEP (126 MW) in Anjaw District of Arunachal Pradesh by M/s. Sai Krishnodaya Industries (P) Ltd.- For consideration of TOR.**

**D. Gimliang HEP (74 MW) in Anjaw District of Arunachal Pradesh by M/s. Sai Krishnodaya Industries (P) Ltd. - For consideration of TOR.**

- |    |                      |   |                           |
|----|----------------------|---|---------------------------|
| 1. | Dr. H. K. Singh      | - | Additional Vice President |
| 2. | Shri K. Palanizamy   | - | General Manager           |
| 3. | Dr. Arun Bhaskar     | - | Consultant, RSET          |
| 4. | Shri Ravinder Bhatia | - | Consultant, RSET          |



**E. Yamne Stage-I HEP (90 MW) Project in Upper Siang District of Arunachal Pradesh by M/s. SS Yamne Power Pvt. Ltd – For reconsideration of TOR**

1. Shri Nipun Tayal - Project Manager
2. Shri G. S. Raju - Sr. Vice President
3. Dr. Aman Sharma - General Manager
4. Dr. S. S. Garhia - Sr. Vice President
5. Shri Rajender Singh - Advisor
6. Dr. K. K. M Menon - Expert Civil Defence

**F. Pemashelpu HEP (90 MW) Project in Upper Siang District of Arunachal Pradesh by M/s. Mechuka Hydro Power Pvt. Ltd – For reconsideration of TOR**

1. Shri Ramesh Chandra - President
2. Shri Arjun Avasthy - Engineer
3. Shri Arivumani - Assistant Manager
4. Shri Senthili - Engineer
5. Shri Ravinder Bhatia - Director

**G. Jeelam-Tamak HEP (108 MW) Project in Chamoli District of Uttarakhand by M/s. THDC Ltd – For Reconsideration of Environmental Clearance.**

1. Shri P. P. S. Mann - General Manager
2. Shri R. K. Vishnoi - General Manager
3. Sh. Sanjay Kher - Additional General
4. Shri Rajiv Govil - Sr. Manager
5. Shri Gajender Singh - Sr. Manager
6. Shri Mayank Jain - Sr. Manager
7. Shri J. S. Rawat - Sr. Environment Officer
8. Shri Brijesh K. Verma - Engineer
9. Shri Rakesh Uniyal - Additional Executive Officer
10. Dr. J. P. Bhatt - Scientist
11. Dr. D. C. Nautiyal - Scientist
12. Dr. Dorje Dawa - Scientist
13. Shri A. P. Choudhary - Consultant

**H. Mohanpura Major Irrigation Project in Rajgarh District of Madhya Pradesh by Water Resources Department, Government of Madhya Pradesh – For consideration of Environmental Clearance.**

1. Shri R. S. Julaniya - Principal Secretary
2. Shri M. G. Choubey - Engineer-in-Chief
3. Dr. Aman Sharma - General Manager
4. Shri S. K. Nigam - Superintending Engineer
5. Shri Sushil Parmar - Assistant Engineer
6. Shri Anil Singh - Executive Engineer
7. Ms. Sipika Srivastava - SDO
8. Ms. Momita M. Ghosh - Sr. Engineer

9. Shri S. M. Dixit - Sr. Engineer
10. Shri A. V. Naidu - Consultant

**I. Kundah Pumped Storage HEP (450 MW) Project in Nilgiri District of Tamil Nadu by M/s. TANGECO Ltd – For reconsideration of extension of the validity of Environmental Clearance.**

1. Shri Shri A. Stephen - Chief Engineer
2. Shri S. Ponnuseshan - Assistant Engineer
3. Shri V. K. Jain - OSD/RM

**J. Upper Subansiri (2000 MW) HEP in Arunachal Pradesh for TOR.**

1. Dr. Acharyulu - Manager
2. Shri S. K. Dutta - Vice President
3. Shri Tarakesh - Assistant Manager

**K. Simang-I HEP (67 MW) project in East Siang District, Arunachal Pradesh by M/s. Lower Simang Power Pvt. Ltd & Simang-II HEP (66 MW) project in East Kameng District, Arunachal Pradesh by M/s. Upper Simang Power Pvt. Ltd- For reconsideration of extension of the validity of TOR.**

1. Shri Manoj Kumar Gupta - President

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